

PROJECT MANUAL

MUC 05120106060010

Property of
Lake and River Enhancement Section
Division of Fish and Wildlife/IDNR
402 W. Washington Street, W-273
Indianapolis, IN 46204



**LAKE
MAXINKUCKEE**

CURTISS DITCH WETLAND

PROJECT MANUAL FOR CURTISS DITCH WETLAND

2nd phase

Wed morning
w/minute

- | | | |
|-----|------|-------|
| 1. | 75% | 1200 |
| 4. | 100% | 11042 |
| 7. | 35% | 2842 |
| 8. | 50% | 1100 |
| 9. | 75% | 2359 |
| 10. | 75% | 1765 |

Financial assistance provided by the
Indiana Department of Natural Resources,
Division of Soil Conservation, Lake
Enhancement Program.

set no.

7.

Constructed and Improved

Wetlands for the Protection of the Water

**Quality of LAKE
MAXINKUCKEE**



Marshall County, Indiana

**Lake Maxinkuckee Environmental Fund
Lake Maxinkuckee Environmental Council
106 N. Main
Culver, IN 46511**

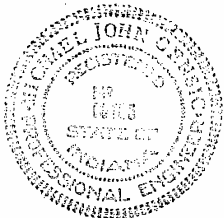
Lake Maxinkuckee Environmental Fund, Inc.

Thomas H. Sams, President
John L. Babcock, Secretary-Treasurer
Richard E. Ford
Ralph N. Manuel
Robert Tanguy
Ellen C. Gignilliat
Jack Campbell

Lake Maxinkuckee Environmental Council

William W. Pippenger, Chairman
Carol H. Hillis, Secretary
Robert Tanguy
Ralph Winters
David Campbell
David Baker
J. Frederick Lintner
Michael L. Overmyer
Lance Overmyer

Karen L. Dehne, Executive Director
106 North Main Street
Culver, Indiana 46511



Michael O'Brien



William B. Eviston



Earth Source Inc

349 Airport North Office Park, Fort Wayne, IN 46825 (219) 489-8511

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INVITATION TO BID

This section will be provided
by the Owner upon Bidding the
Project.

BIDDING REQUIREMENTS, FORMS, & INFORMATION

INSTRUCTIONS TO BIDDERS

Page ITB-1, Section 3., QUALIFICATIONS ON BIDDERS. should read:

Each Bid shall include the Plan and Equipment Questionnaire and references.

Page ITB-6, Section 14., OPENING OF BIDS. should read:

Bids will be opened and (unless obviously non-responsive) read privately. A copy of the certified Bid tabulation sheet(s) will be furnished to each Bidder sometime after the tentative awards have been made.

Page ITB-10, Section 30., SUMMARY OF ITEMS TO BE SUBMITTED WITH BID.
and continued on page ITB-11 should read:

1. Bid Form - Completely executed and signed.
2. Bid Security - Acceptable bid bond or cashier's check in an amount not less than 5% of the total bid price.
3. Letter from surety.
4. Completed Plan and Equipment Questionnaire.
5. List of References.

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS. (Owner refers to the LAKE MAXINKUCKEE ENVIRONMENTAL FUND, 106 N. Main St. Culver, IN 46511 (219) 842-3686. Landscape Architect, Project Designer, or "Engineer" refers to Earth Source, Inc., 349 Airport North Office Park, Fort Wayne, IN 46825 219-489-8511. Other terms, such as 'Contracting Officer' and 'Project Representative' refer to the Lake Maxinkuckee Environmental Fund (LMEF), who is the responsible contracting agency who will refer items to the proper individual, consultant, or agency for action. The term "Bidder" means one who submits a Bid directly to Owner, as distinct from a sub-bidder, who submits a bid to a Bidder. The term "Successful Bidder" means the lowest, qualified, responsible and responsive Bidder to whom the Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award. The term "Bidding Documents" includes the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids.)

2. COPIES OF BIDDING DOCUMENTS.

2.1 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Landscape Architect. The refundable portion of the bid deposit will be returned to bid document holders of record who return the Bidding Documents in good condition. Refund will be made on or about the 30th day after the Bid Opening Date.

2.2 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Landscape Architect assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner and Landscape Architect in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS ON BIDDERS.

Each Bid shall include ~~Form 96~~^{city form}, Contractors Bid for Public Works, provided and executed by the Bidders, as required by State Statute. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE.

4.1 It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly, (b) visit the site to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work, (c) consider federal, state and local Laws and Regulations that may affect cost, progress, performance of furnishing of the Work, (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors or discrepancies in the Contract Documents.

4.2 Information and data reflected in the Contract Documents with respect to Underground Facilities at or Contiguous to the site is based upon information and data furnished to Owner and L.A. by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary Conditions.

4.3 Before submitting a Bid, each Bidder will be responsible to make or obtain such explorations, tests and data concerning physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site, or otherwise which may affect cost, progress, performance or furnishing of the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

4.4 On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up and restore the site to its former condition upon completion of such explorations.

4.5 The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easement for permanent structures or permanent changes in otherwise provided in the Contract Documents.

4.6 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that

without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

5. INTERPRETATIONS AND ADDENDA.

5.1 All questions about the meaning or intent of the Contract Documents are to be directed to L.A. Interpretations or clarifications considered necessary by L.A. in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by L.A. as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

5.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner of L.A.

6. BID SECURITY. *5% bid bond*

6.1 Each must be accompanied by Bid security made payable to Owner in an amount of five percent of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond (on form attached, if a form is prescribed) issued by a surety meeting the requirements of Paragraph 5.1 of the General Conditions.

6.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required contract security, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the forty-sixth day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

6.3 Bid security will not be required on bids totalling \$25,000 or less.

7. CONTRACT TIME.

The numbers of days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the Contract Time) are set forth in the Bid Form, the Agreement, and in the latter sections of these Instructions to Bidders.

8. LIQUIDATED DAMAGES.

Provisions for liquidated damages, if any, are set forth in the Agreement and in the latter sections of these Instructions to Bidders.

9. SUBSTITUTE OR "OR-EQUAL" ITEMS.

The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to L.A., application for such acceptance will not be considered by L.A. until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by L.A. is set forth in Paragraphs 6.7.1, 6.7.2 and 6.7.3 of the General Conditions.

10. SUBCONTRACTORS, SUPPLIERS AND OTHERS.

10.1 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of the specified date prior to the Effective Date of the Agreement, the apparent successful Bidder, and any other Bidder so requested, shall within seven days after the Bid opening submit to Owner a list of all such Subcontractors, Suppliers and other persons and organizations proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person or organization if requested by Owner. If Owner or L.A. after due investigation has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, either may before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable

substitute without an increase in Bid price.

If apparent Successful Bidder declines to make any such substitution, Owner may award the contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers and other persons and organizations. The declining to make requested substitutions will not constitute grounds for sacrificing the Bid security of any Bidder. Any Subcontractor, Supplier, other person or organization listed and to whom Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and L.A., subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.8.2 of the General conditions.

10.2 In contracts where the Contract Price is on the basis of Cost-of-the-Work Plus a Fee, the apparent Successful Bidder, prior to the Notice of Award, shall identify in writing to Owner those portions of the Work that such Bidder proposes to subcontract and after the Notice of Award may only subcontract other portions of the Work with Owner's written consent.

10.3 No Contractor shall be required to employ any Subcontractor, Supplier, other person or organization against whom Contractor has reasonable objection.

11. BID FORM.

11.1 The Bid Form is included with the Bidding Documents; additional copies may be obtained from L.A. (or the issuing office).

11.2 All blanks on the Bid Form must be completed in ink or by typewriter.

11.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

11.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

11.5 All names must be typed or printed below the signature.

11.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

11.7 The address and telephone number for communications regarding the Bid must be shown.

12. SUBMISSION OF BIDS.

12.1 Bids shall be submitted at the time and place indicated in the Advertisement of Invitation to Bid and shall be enclosed in an opaque sealed envelope, marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and name and address of the Bidder and accompanied by the Bid security and other required documents. If the Bid is sent thorough the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it.

12.2 It is the intent of the Owner to open Bids immediately after the designated time in the Advertisement for Bids. However, the Owner reserves the right to delay the Bid opening process in the event of unforeseen circumstances as determined by the Owner that may be a factor in delaying a Bidder from delivering a Bid on time. No Bids will be received or opened after the Bid opening process has begun.

13. MODIFICATION AND WITHDRAWAL OF BIDS.

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that a Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

13.2 If, within twenty-four hours after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid and the Bid security will be returned. Thereafter, that Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.

14. OPENING OF BIDS.

Bids will be opened and (unless obviously non-responsive) ~~read aloud publicly~~. A copy of the certified Bid tabulation sheet(s) will be furnished to each Bidder sometime after the tentative awards have been made.

15. AWARD OF CONTRACT.

15.1 Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder, and the right to disregard all nonconforming, nonresponsive, unbalanced or conditional Bids.

Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by Owner. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

15.2 In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

15.3 Owner may consider the qualifications and experience of Subcontractors, Suppliers and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

15.4 Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.

15.5 If the contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interests of the Project.

16. ~~CONTRACT SECURITY.~~

~~Paragraph 5.1 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to performance and payment Bonds. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by the required performance and payment Bonds.~~

17. SIGNING OF AGREEMENT.

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with all other written Contract Documents attached. Within fifteen days thereafter Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Contractor.

18. LETTER FROM SURETY.

In addition to the Bid bond, the Bidder shall submit a letter or statement from the Bidder's surety company that it will execute and deliver a one hundred percent surety bond.

19. SECURITY FOR FAITHFUL PERFORMANCE.

Simultaneously with the delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the Project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

20. POWER OF ATTORNEY.

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

21. LAWS AND REGULATIONS.

The Bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the contract throughout, and they will be deemed to be included in the Contract the same as though

herein written out in full.

22. SAFETY STANDARDS AND ACCIDENT PREVENTION.

With respect to all work performed under this Contract, the Contractor shall:

a. Comply with the safety standards provisions of applicable laws, building and construction codes, and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the "Federal Register", Volume 36, No. 75, Saturday, April 17, 1971.

b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.

c. Maintain at his office or other well-known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor's care of persons (including employees), who may be injured on the job site. In no case shall employees be permitted to work at a job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor's care.

23. TAX EXEMPTIONS.

~~The Indiana Dept. of Revenue requires that the Contractor or Subcontractors engaged in a contract with a governmental agency must submit an exemption certificate for construction contractors (Form SP 134) to each supplier for each exempt Project. The Owner will cooperate with the Contractor in filing the necessary forms with the Indiana Dept. of Revenue, but the Contractor shall be responsible for the initiation of these proceedings. The contract price will be based upon a complete exemption from this tax, and if later determined that a tax must be paid by the Owner, the contract price will be adjusted to reflect this liability to the Owner.~~

24. ESCROW ACCOUNT(S)

The establishment of an escrow account between the Owner and the successful Bidder(s) for the retainage will be left to the sole discretion of the successful Bidder(s).

25. BIDS TO REMAIN OPEN.

All Bids shall remain open for ninety (90) days after the day of the Bid opening. The Owner may release any Bid and return the Bid security prior to that date.

26. COMPLETION TIME AND LIQUIDATED DAMAGES.

The Owner is very interested in getting this project built as soon as possible.

The Bidder must agree to commence work on or before the date to be specified in the written Notice to Proceed. Bidder must agree that the work be substantially complete and totally completed within the following consecutive calendar days after the date when Contract Time commences to run:

(SEE ATTACHED SHEET) *page CS-1*

27. FAMILIARITY WITH PROJECT SITE.

Bidders are required to walk the project on the day of the Pre-Bid Conference or any time prior to the preparation of their Bids.

~~28. WAGE RATES.~~

~~Davis-Bacon does not apply to this project. Contractors will be required, however, to pay wage rates according to the Indiana wage rate decision enclosed in this Project Manual.~~

30. SUMMARY OF ITEMS TO BE SUBMITTED WITH BID.

1. Bid Form - Completely executed and signed
2. Bid Security - Acceptable bid bond or cashier's check in an amount not less than 10% of the total bid price. *5*
3. Letter from Surety

(Items to be submitted with bid continued)

4. Form 96 - Contractors Bid for Public Works, executed, signed, and complete.
5. Certification of Non-Segregated Facilities
6. Non-Discrimination Clause
7. Copy of Contractor's Financial Statement.

SPECIAL REQUIREMENTS TO NOTICE TO BIDDERS.

1. The Contractor must report any archaeological or cultural material that may be encountered during construction immediately to the Project Representative or Owner.
2. The Contractor must supply name of all subcontractors prior to contract approval.
3. All contractors and subcontractors will be required to provide in writing sources of materials and supplies prior to ordering, delivery, or use on the site. Failure to do so may result in rejection and/or nonpayment of the finished work.
4. Include all mobilization in bid items.
5. Payment will be made as per Bid Form. If quantities are substantially less or more than the contracted amount, the Contractor or Project Representative must initiate a change order to the contract. Measured or agreed quantities for these items will then become the basis for payment. It is the intent of the Project Designer that no measurement for quantities will be necessary.
6. For this project, the Owner and Property Owner requires \$1 million liability insurance coverage provided by the Contractor.
7. The parties included in the preconstruction conference, any change orders, substantial completion determination, and completion acceptance are the Owner, Engineer, and Lake Enhancement Staff.

BID

TO: LAKE MAXINKUCKEE
ENVIRONMENTAL FUND
106 N. Main St.
Culver, IN 46511

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to complete all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid Security. This Bid will remain open for Thirty (30) days after the day of Bid opening. BIDDER will sign the Agreement and submit the Contract Security and other Documents required by the Contract Documents within fifteen (15) days after the date of OWNER'S Notice of Award.
3. In submitting his Bid, BIDDER represents, as more fully set forth in the Agreement, that:
 - a. BIDDER has examined copies of all the Contract Documents, Advertisement or Invitation to Bid and the Instructions to Bidders, and BIDDER has examined copies of (receipt of all of which are hereby acknowledged) Addenda Nos. _____.
 - b. BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
 - c. BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions as provided in the General Conditions, and accepts the determination set forth in the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which BIDDER is entitled to rely.
 - d. BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations,

CURTISS DITCH

Constructed Wetland-Lake Maxinkuckee

BID FORM

<u>Item</u>	<u>Spec.</u>		<u>Unit Price</u>	<u>Extension</u>
	<u>No.</u>	<u>Quantity</u>		
1. CONSTRUCTION ENGINEERING/LAYOUT	01050	L.S.	_____	_____
2. POLLUTION CONTROL	5	L.S.	_____	_____
3. CLEARING	1,3	L.S.	_____	_____
4. SPILLWAY PIPE SYSTEM	51	L.S.	_____	_____
5. CHANNEL PIPING	51	365L.F.	_____	_____
6. PIPE GATE	81	5	_____	_____
7. TOPSOIL STRIPPING & REPLACEMENT	26	L.S.	_____	_____
8. COMMON SITE EXCAVATION	21	1000C.Y.	_____	_____
9. COMMON EXCAVATION (sediment traps, islands)	21	1430C.Y.	_____	_____
10. COMMON EXCAVATION (baffle locations)	21	1070C.Y.	_____	_____
11. EARTH FILL-Class B embankment	23	5400C.Y.	_____	_____
12. RIP RAP (spillway)	61 & S.R.#5	185 C.Y.	_____	_____
13. GABIONS (spillway)	64 & S.R.#3	32 S.Y.	_____	_____
14. FILTER FABRIC	S.R.#4	550 S.Y.	_____	_____
15. #53 STONE	S.R.#5	12 Ton	_____	_____
16. FARM FENCE	S.R.#7	300 L.F.	_____	_____
17. EROSION CONTROL MATERIALS	02491&S.R.#9	2200S.Y.	_____	_____
18. LANDSCAPING/RESTORATION (as per Plant List sht C5, include Planting & Fine Grading & Seeding Items)	02491/02495	L.S.	_____	_____
notes:				=====
S.R. = Special Requirements	TOTAL BID (Base)		_____	_____
L.S. = Lump sum	Performance Bond		_____	_____
L.F. = Linear feet	TOTAL BID		_____	=====
S.Y. = Square yards				_____
C.Y. = Cubic yards				_____

signature

date

business name

tests and studies (in addition to or to supplement those referred to in C above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance or furnishing of the Work as BIDDER considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of the General Conditions; and no additional examinations, investigation, exploration, test, reports or similar information or data are or will be required by BIDDER for such purpose.

- e. BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Paragraph 4.3 of the General Conditions.
 - f. BIDDER has correlated the results of all such observations, examinations, investigations, exploration, tests, reports and studies with the terms and conditions of the Contract Documents.
 - g. BIDDER has given Landscape Architect written notice of all conflicts, errors or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by Landscape Architect is acceptable to BIDDER.
 - h. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
4. BIDDER will complete the Work for the following prices:
(Where lump sum figures are used, the Contractor shall furnish to the Engineer upon request a detailed breakdown

of said lump sum cost. Where unit and unit price figures are used as part of the Bid, they will be used in computing the Contractor's payments. Quantities are not guaranteed.

5. BIDDER agrees that the work will be substantially complete and totally complete within the following consecutive calendar days after the date when the contract time commences to run.
6. The following documents are attached to and made condition of this Bid:
 - a. Bid Security in the form, of a bidder's bond or cashier's check in amount of not less than five percent of the total bid price on bids exceeding \$25,000.
 - b. Indiana State Board of Accounts Standard Questionnaire Form 96 for Bids of \$,000 or more.
 - c. Non-Collusion Affidavit
 - d. Letter from Surety
7. The term used in this Bid which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.
8. Submitted on _____ .19__
- By: Contractor _____
(Corporation__) (Partnership__) (Individual__)

(SEAL)

By _____

(Name & Title of Person
Authorized to Sign)

Business Address: _____

Phone _____

BID

Page BF-4, Section 6. should read:

6. The following documents are attached to and made condition of this Bid:
 - a. Bid Security - Acceptable bid bond or cashier's check in an amount not less than 5% of the total bid price.
 - b. Letter from surety.
 - c. Completed Plan and Equipment Questionnaire.
 - d. List of References.

ADDENDUM

This Addendum should be added as page BF-5 and shall read as follows:

1. List references from private firms for which you have performed work. List should include work completed during the last two years or last four jobs, whichever is greater. List may include current firm for which you are performing work.

2. Plan and Equipment Questionnaire

- a. Explain your plan or layout for performing proposed work.
- b. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you expect to require a bond.
- c. What equipment do you intend to use for the proposed project?
- d. Have you made contracts or received offers for all materials within prices used in preparing your proposal?

PUBLIC WORKS PROJECTS

Form No. 96 (Revised 1987)

Page 96-1 should be deleted. Disregard.

Page 96-2 should be deleted. Disregard.

Page 96-3 should be deleted. Disregard.

Page 96-4 should be deleted. Disregard.

BID OF

(Contractor)

(Address)

FOR
PUBLIC WORKS PROJECTS
OF

Filed _____, 19__

Action taken _____

CONTRACTORS BID FOR PUBLIC WORKS

PART I

(To be completed for all bids)
(Please type or print)

- Date: _____
1. Governmental Unit: _____
2. County: _____
3. Bidder (Firm): _____
Address: _____
City/State: _____
4. Telephone Number: _____
5. Agent of Bidder (If applicable): _____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of _____ (Governmental Unit) in accordance with plans and specifications of said unit for the sum of \$ _____. The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, submit a proposal for each in accordance with the notice.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract. If the bid is to be awarded on a unit basis, the itemization of units shall be shown on a separate attachment. The Contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(if applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States. I.C. 5-16-8-2. I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

NON-COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to induce anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee, gift, commission or thing of value on account of such sale.

OATH AND AFFIRMATION

I affirm under the penalties of perjury that the foregoing facts and information are true and correct to the best of my knowledge and belief.

Dated at _____ this _____ day of _____, 19____.

(Name of Organization)

By _____

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
COUNTY OF _____) SS:

_____ being duly sworn, deposes and says that he is _____ of the above _____ (Name of Organization) and that the statements contained in the foregoing bid, certification and affidavit are true and correct.

Subscribed and sworn to before me this _____ day of _____, 19____.

Notary Public

My Commission Expires: _____
County of Residence: _____

ACCEPTANCE

The above bid is accepted this _____ day of _____, 19____, subject to the following conditions: _____

Contracting Authority Members:

_____	_____
_____	_____
_____	_____

PART II

(Complete sections I, II, III and IV for all state and local public works projects as required by statutes.)

Governmental Unit: _____

Bidder (Firm): _____

Date: _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed?

Contract Amount	Class of Work	When Completed	Name and Address of Owner

2. What public works projects has your organization now in process of construction?

Contract Amount	Class of Work	When to be Completed	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

4. List references from private firms for which you have performed work.

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work.
2. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you expect to require a bond.
3. What equipment do you intend to use for the proposed project?
4. Have you made contracts or received offers for all materials within prices used in preparing your proposal?

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

SECTION IV OATH AND AFFIRMATION

I hereby affirm under the penalties of perjury that the facts and information contained in the foregoing bid for public works are true and correct to the best of my knowledge and belief.

Dated at _____ this _____ day of _____, 19__.

(Name of Organization)

By _____

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
COUNTY OF _____) SS:

_____ being duly sworn, deposes and says that he is _____ of the above _____ and that the answers to the questions in the foregoing questionnaires and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 19__.

Notary Public

My Commission Expires: _____

County of Residence: _____

Curtiss Site

PROJECT CONSTRUCTION SCHEDULE

	<u>days</u>
Clearing	0-14
Sediment Traps & Erosion Control	15-30
Earthwork & Piping	30-60
Channel, Erosion Control	30-
Landscape Construction	60-90
(season permitting)	

FOR THIS PROJECT, SITE CONSTRUCTION IS
PLANNED TO BEGIN SEPTEMBER 5. SOME
LAYOUT OPERATIONS MAY BEGIN AUGUST 20,
BUT NO EQUIPMENT MAY BE DELIVERED UNTIL
TIME FOR CONSTRUCTION, SEPTEMBER 5.

FORM OF CONTRACT

to be provided at time of bidding by Owner.

NOTICE OF AWARD

DATE: _____, 19__

TO CONTRACTOR:

PROJECT: (Insert name of Contract as it appears in the Bid Documents)

You are hereby notified that your Bid dated _____, 19__, for the above Contract has been evaluated and you are the apparent successful bidder. You have been awarded a contract for (insert description of work including which, if any, alternate bids)

The Contract Price of your contract is \$ _____.

Three copies of the proposed Agreement (Contract) accompany this Notice of Award. Three sets of the plans and project manual will be delivered separately or otherwise be made available to you.

You must comply with the following conditions within fifteen days of the date of this Notice of Award, that is by _____, 19__.

1. You must deliver to the Owner three fully executed counterparts of the Agreement (Contract). Each of the Agreements must bear your signature.
2. You must deliver the Contract Securities (Performance & Payment Bonds) as specified in the Instructions to Bidders, General Conditions and Supplementary Conditions.
3. You must deliver the certificates of insurance as specified in the General Conditions and Supplementary Conditions (paragraph S.C. 5.3).
4. (List other conditions, if applicable):

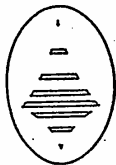
Failure to comply with these conditions within the time specified will entitle OWNER to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten days after you comply with these conditions, OWNER will return to you one fully signed counterpart of the Agreement for your records.

OWNER:

(Name & Title)

(City, Town or County)



Earth-Source Inc

349 Airport North Office Park, Fort Wayne, IN 46825 (219) 489-8511

NOTICE TO PROCEED

DATE: _____, 19____

TO CONTRACTOR:

PROJECT: (Insert name of Contract as it appears in the Bid Documents)

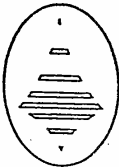
You are hereby notified to proceed with the above referenced project and that Contract Time for the above contract will commence to run on _____, 19____. No later than that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement (contract), the dates of Substantial Completion and Final Completion are _____, 19____, and _____, 19____, respectively.

Before you may start any Work at the site, Paragraph 2.7 of the General Conditions provides that you deliver to us certificates of insurance (with a copy sent to the Engineer) per the Contract Documents.

OWNER:

(Name and Title)

(City, Town, or County)



Earth-Source Inc

349 Airport North Office Park, Fort Wayne, IN 46825 (219) 489-8511

CERTIFICATE OF SUBSTANTIAL COMPLETION

OWNER's Project No.

ENGINEER's Project No.

Project

CONTRACTOR

Contract For

Contract Date

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

To
OWNER

And To
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

.....
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

EJCDC No. 1910-8-D (1983 Edition)

Prepared by the Engineers' Joint Contract Documents Committee and endorsed by The Associated General Contractors of America.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities insurance and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: _____

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on _____, 19 _____

ENGINEER

By _____

CONTRACTOR accepts this Certificate of Substantial Completion on _____, 19 _____

CONTRACTOR

By _____

OWNER accepts this Certificate of Substantial Completion on _____, 19 _____

OWNER

By _____
LAKE ENHANCEMENT STAFF accepts on _____

19 _____

by _____

COMPLETION AFFIDAVIT

CERTIFICATE OF PUBLIC UTILITIES

IN THE MATTER relating to the Improvement Project and Contract

for _____ and the plans
and specifications relating thereto comes now _____,
who being duly sworn upon oath and says he is _____ of
(title)
_____, the corporation to whom was awarded
(corporation name)
the contract, and who performed the work required under _____
_____ Improvement Project.

The undersigned is familiar with and personally knows the requirements of
the plans and specifications of the improvement project and contract, and further
knows that _____ has complied with the terms
(corporation name)
and conditions of the contract in every particular, and that the material used
was of the character, kind, quantity and quality required therein, and that
any and all subcontractors, material suppliers, and workmen have received their
just compensation, all this according to and under the direction of the

(Owner)

(Corporation Name)

By _____
(Principal)

STATE OF INDIANA:

SS:

COUNTY OF _____

SUBSCRIBED and sworn to before me, this _____ day of _____,

19____.

Notary Public

(Printed/typed name of Notary)

Resident of _____ County, Indiana

My Commission Expires:

CONDITIONS & REQUIREMENTS

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by
Engineers' Joint Contract Documents Committee
and
Issued and Published Jointly By



PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

CONSTRUCTION SPECIFICATIONS INSTITUTE

This document has been approved and endorsed by

The Associated General  Contractors of America

These General Conditions have been prepared for use with the Owner-Contractor Agreements (No. 1910-8-A-1 or 1910-8-A-2, 1983 editions). Their provisions are interrelated and a change in one may necessitate a change in the others. Comments concerning their usage are contained in the Commentary on Agreements for Engineering Services and Contract Documents, No. 1910-9, 1981 edition. For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. 1910-17, 1983 edition). When bidding is involved, the Standard Form of Instructions to Bidders (No. 1910-12, 1983 edition) may be used.

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GENERAL CONDITIONS

ARTICLE I—DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

Addenda—Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

Agreement—The written agreement between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment—The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Bid—The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bonds—Bid, performance and payment bonds and other instruments of security.

Change Order—A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents—The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.

Contract Price—The moneys payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

Contract Time—The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

CONTRACTOR—The person, firm or corporation with whom OWNER has entered into the Agreement.

defective—An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.8 or 14.10).

Drawings—The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

Effective Date of the Agreement—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

ENGINEER—The person, firm or corporation named as such in the Agreement.

Field Order—A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Time.

General Requirements—Sections of Division I of the Specifications—

Laws and Regulations; Laws or Regulations—Laws, rules, regulations, ordinances, codes and/or orders.

Notice of Award—The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

Notice to Proceed—A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR'S obligations under the Contract Documents.

OWNER—The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

Partial Utilization—Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

Project—The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

Resident Project Representative—The authorized representative of ENGINEER who is assigned to the site or any part thereof.

Shop Drawings—All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for CONTRACTOR to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by CONTRACTOR to illustrate material or equipment for some portion of the Work.

Specifications—Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

Subcontractor—An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

Substantial Completion—The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if there be no such certificate issued, when final payment is due in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.

Supplementary Conditions—The part of the Contract Documents which amends or supplements these General Conditions.

Supplier—A manufacturer, fabricator, supplier, distributor, materialman or vendor.

Underground Facilities—All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communication, cable television, sewage and drainage removal, traffic or other control systems or water.

Unit Price Work—Work to be paid for on the basis of unit prices.

Work—The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

Work Directive Change—A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER,

ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

Written Amendment—A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly Work-related aspects of the Contract Documents.

ARTICLE 2—PRELIMINARY MATTERS

Delivery of Bonds:

2.1. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2. OWNER shall furnish to CONTRACTOR up to 5 copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Time; Notice to Proceed:

2.3. The Contract Time will commence to run on the thirtieth day after the Effective Date of the Agreement, or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within thirty days after the Effective Date of the Agreement. ~~In no event will the Contract Time commence to run later than the seventy-fifth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.~~ (See supplementary conditions)

Starting the Project:

2.4. CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

Before Starting Construction:

2.5. Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown

thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

2.6. Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1. an estimated progress schedule indicating the starting and completion dates of the various stages of the Work;

2.6.2. a preliminary schedule of Shop Drawing submissions; and

2.6.3. a preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by CONTRACTOR at the time of submission.

2.7. Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to ENGINEER, certificates (and other evidence of insurance requested by OWNER) which CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4, and OWNER shall deliver to CONTRACTOR certificates (and other evidence of insurance requested by CONTRACTOR) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7.

Preconstruction Conference:

2.8. Within twenty days after the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the site, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

Finalizing Schedules:

2.9. At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with para-

graph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility therefor. The finalized schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials or equipment such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification

from ENGINEER; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

Amending and Supplementing Contract Documents:

3.4. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.4.1. a formal Written Amendment,

3.4.2. a Change Order (pursuant to paragraph 10.4), or

3.4.3. a Work Directive Change (pursuant to paragraph 10.1).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order or a Written Amendment.

3.5. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.5.1. a Field Order (pursuant to paragraph 9.5),

3.5.2. ENGINEER's approval of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27), or

3.5.3. ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.6. Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4—AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

Availability of Lands:

4.1. OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and

such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR believes that any delay in OWNER's furnishing these lands, rights-of-way or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefor as provided in Article 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

Physical Conditions:

4.2.1. *Explorations and Reports:* Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon nontechnical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site.

4.2.2. *Existing Structures:* Reference is made to the Supplementary Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities referred to in paragraph 4.3) which are at or contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, but not for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.2.3. *Report of Differing Conditions:* If CONTRACTOR believes that:

4.2.3.1. any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2. any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify OWNER and ENGINEER in writing about the inaccuracy or difference.

4.2.4. ENGINEER's Review: ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5. Possible Document Change: If ENGINEER concludes that there is a material error in the Contract Documents or that because of newly discovered conditions a change in the Contract Documents is required, a Work Directive Change or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6. Possible Price and Time Adjustments: In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference. If OWNER and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

Physical Conditions—Underground Facilities:

4.3.1. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and,

4.3.1.2. CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2. Not Shown or Indicated. If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to

determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of. If the parties are unable to agree as to the amount or length thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Reference Points:

4.4. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work (unless otherwise specified in the General Requirements), shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

ARTICLE 5—BONDS AND INSURANCE

Performance and Other Bonds:

5.1. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

5.2. If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of

the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to OWNER.

Contractor's Liability Insurance:

5.3. CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

5.3.1. Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts;

5.3.2. Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

5.3.3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.3.4. Claims for damages insured by personal injury liability coverage which are sustained (a) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (b) by any other person for any other reason;

5.3.5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

5.3.6. Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

5.3.7. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

The insurance required by this paragraph 5.3 shall include the specific coverages and be written for not less than the limits of liability and coverages provided in the Supplementary Conditions, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least

thirty days' prior written notice has been given to OWNER and ENGINEER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing defective Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish OWNER with evidence of continuation of such insurance at final payment and one year thereafter.

Contractual Liability Insurance:

5.4. The comprehensive general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's obligations under paragraphs 6.30 and 6.31.

Owner's Liability Insurance:

5.5. OWNER shall be responsible for purchasing and maintaining OWNER's own liability insurance and, at OWNER's option, may purchase and maintain such insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

Property Insurance:

5.6. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insureds or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment.

5.7. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER AND ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties.

5.8. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to CONTRACTOR by certified mail and will contain waiver provisions in accordance with paragraph 5.11.2.

5.9. OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are provided in the Supplementary Conditions. The risk of loss within the deductible amount, will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policy, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

Waiver of Rights:

5.11.1. OWNER and CONTRACTOR waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraphs 5.6 and 5.7 and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractors, ENGINEER, ENGINEER's consultants and all other parties named as insureds in such policies for losses and damages so caused. As required by paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of OWNER, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insureds. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

5.11.2. OWNER and CONTRACTOR intend that any policies provided in response to paragraphs 5.6 and 5.7 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any of the parties named as insureds or additional insureds, and if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER's consultant OWNER will obtain the same, and if

such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

Receipt and Application of Proceeds:

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13. OWNER as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as trustee shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, OWNER as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of such duties.

Acceptance of Insurance:

5.14. IF OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.6 and 5.7 on the basis of its not complying with the Contract Documents, OWNER shall notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.7. If CONTRACTOR has any objection to the coverage afforded by or other provisions of the policies of insurance required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 on the basis of their not complying with the Contract Documents, CONTRACTOR shall notify OWNER in writing thereof within ten days of the date of delivery of such certificates to CONTRACTOR in accordance with paragraph 2.7. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided by each as the other may reasonably request. Failure by OWNER or CONTRACTOR to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased by the other as complying with the Contract Documents.

Partial Utilization—Property Insurance:

5.15. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no

n use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

ARTICLE 6—CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. CONTRACTOR shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or selection of a specific means, method, technique, sequence or procedure of construction which is indicated in and required by the Contract Documents; CONTRACTOR shall be responsible to see that the finished Work complies accurately with the Contract Documents.

6.2. CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

Adjusting Progress Schedule:

6.6. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

Substitutes or "Or-Equal" Items:

6.7.1. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other Suppliers may be accepted by ENGINEER if sufficient information is submitted by CONTRACTOR to allow ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named. The procedure for review by ENGINEER will include the following as supplemented in the General Requirements. Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or

royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute.

6.7.2. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER and as may be supplemented in the General Requirements.

6.7.3. ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute. ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's consultants for evaluating each proposed substitute.

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by

OWNER and ENGINEER and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be increased by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

6.9. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.10. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.11. All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER and contains waiver provisions as required by paragraph 5.11. CONTRACTOR shall pay each Subcontractor a just share of any insurance moneys received by CONTRACTOR on account of losses under policies issued pursuant to paragraphs 5.6 and 5.7.

Patent Fees and Royalties:

6.12. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER

or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorneys' fees and court and arbitration costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Permits:

6.13. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids, or if there are no Bids on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2. If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

Taxes:

6.15. CONTRACTOR shall pay all sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the

place of the Project which are applicable during the performance of the Work.

Use of Premises:

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the Work. Should any claim be made against OWNER or ENGINEER by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold OWNER and ENGINEER harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any such other party against OWNER or ENGINEER to the extent based on a claim arising out of CONTRACTOR's performance of the Work.

6.17. During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon com-

pletion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection:

6.20. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1. all employees on the Work and other persons and organizations who may be affected thereby;

6.20.2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.21. CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

Emergencies:

6.22. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

Shop Drawings and Samples:

6.23. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, five copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to review the information as required.

6.24. CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.25.1. Before submission of each Shop Drawing or sample CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.25.2. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on

each Shop Drawing submitted to ENGINEER for review and approval of each such variation.

6.26. ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.27. ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1.

6.28. Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER's review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

Continuing the Work:

6.29. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

Indemnification:

6.30. To the fullest extent permitted by Laws and Regulations CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and their consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work,

provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31. In any and all claims against OWNER or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6.32. The obligations of CONTRACTOR under paragraph 6.30 shall not extend to the liability of ENGINEER, ENGINEER's consultants, agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

ARTICLE 7—OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work; and, if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

7.2. CONTRACTOR shall afford each utility owner and other contractor who is a party to such a direct contract (or OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the Work with theirs. CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CON-

TRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

7.3. If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility owner (or OWNER), CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR's failure so to report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Supplementary Conditions. Unless otherwise provided in the Supplementary Conditions, neither OWNER nor ENGINEER shall have any authority or responsibility in respect of such coordination.

ARTICLE 8—OWNER'S RESPONSIBILITIES

8.1. OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER. Any dispute in connection with such appointment shall be subject to arbitration.

8.3. OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing struc-

tures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.5. OWNER's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.8.

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

ARTICLE 9—ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2. ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform to the Contract Documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

Project Representation:

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in observing the performance of the Work. The duties, responsibilities and limitations of authority of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions. If OWNER designates another agent to represent OWNER at the site who is not ENGINEER's agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall perform the Work involved promptly. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

Rejecting Defective Work:

9.6. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be *defective*, and will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7. In connection with ENGINEER's responsibility for Shop Drawings and samples, see paragraphs 6.23 through 6.29 inclusive.

9.8. In connection with ENGINEER's responsibilities as to Change Orders, see Articles 10, 11 and 12.

9.9. In connection with ENGINEER's responsibilities in respect of Applications for Payment, etc., see Article 14.

Determinations for Unit Prices:

9.10. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decisions thereon will be final and binding upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other party to the Agreement and

to ENGINEER written notice of intention to appeal from such a decision.

Decisions on Disputes:

9.11. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

Limitations on ENGINEER's Responsibilities:

9.13. Neither ENGINEER's authority to act under this, Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Sub-contractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14. Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be

effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

9.15. ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10—CHANGES IN THE WORK

10.1. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefor as provided in Article 11 or Article 12.

10.3. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4 and 3.5, except in the case of an emergency as provided in paragraph 6.22 and except in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments) covering:

10.4.1. changes in the Work which are ordered by OWNER pursuant to paragraph 10.1, are required because of acceptance of defective Work under paragraph 13.13 or correcting defective Work under paragraph 13.14, or are agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Time which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11—CHANGE OF CONTRACT PRICE

11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3. The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1. through 11.9.3, inclusive).

11.3.2. By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2.1).

11.3.3. On the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.6 and 11.7).

Cost of the Work:

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work Plus a Fee, the Subcontractor's Cost of the Work shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject

to the other provisions of the Contract Documents insofar as applicable.

11.4.4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5. Supplemental costs including the following:

11.4.5.1. The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

11.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof—all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4. Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.4.5.6. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage

requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7. The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by OWNER in accordance with paragraph 5.9.

11.5. The term Cost of the Work shall not include any of the following:

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4— all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR'S capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

11.5.6. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

CONTRACTOR's Fee:

11.6. The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee; or if none can be agreed upon,

11.6.2. a fee based on the following percentages of the various portions of the Cost of the Work:

11.6.2.1. for costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's Fee shall be fifteen percent;

11.6.2.2. for costs incurred under paragraph 11.4.3, the CONTRACTOR's Fee shall be five percent; and if a subcontract is on the basis of Cost of the Work Plus a Fee, the maximum allowable to CONTRACTOR on account of overhead and profit of all Subcontractors shall be fifteen percent;

11.6.2.3. no fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.4. the amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in CONTRACTOR's Fee by an amount equal to ten percent of the net decrease; and

11.6.2.5. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's Fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.4, inclusive.

11.7. Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to ENGINEER. CONTRACTOR agrees that:

11.8.1. The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site, and all applicable taxes; and

11.8.2. CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the

allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

Unit Price Work:

11.9.1. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10.

11.9.2. Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

~~11.9.3. Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the amount of any such increase.~~

(see supplementary conditions)

ARTICLE 12—CHANGE OF CONTRACT TIME

12.1. The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time

shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing additional work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

12.3. All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) for delay by either party.

ARTICLE 13—WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

Warranty and Guarantee:

13.1. CONTRACTOR warrants and guarantees to OWNER and ENGINEER that all Work will be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects shall be given to CONTRACTOR. All defective Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2. ENGINEER and ENGINEER's representatives, other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.

Tests and Inspections:

13.3. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals.

13.4. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved, CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also

be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by OWNER (unless otherwise specified).

13.5. All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and CONTRACTOR (or by ENGINEER if so specified).

13.6. If any Work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation. Such uncovering shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.7. Neither observations by ENGINEER nor inspections, tests or approvals by others shall relieve CONTRACTOR from CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

Uncovering Work:

13.8. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.9. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such Work is not found to be *defective*, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent

thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

Owner May Stop the Work:

13.10. If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any other party.

Correction or Removal of Defective Work:

13.11. If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with *nondefective* Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

One Year Correction Period:

13.12. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be *defective*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions, either correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with *nondefective* Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by CONTRACTOR. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall bear all direct, indirect and consequential

costs attributable to OWNER's evaluation of and determination to accept such *defective* Work (such costs to be approved by ENGINEER as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct *defective* Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees such access to the site as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's *defective* Work. CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14—PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1. The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

Application for Progress Payment:

14.2. At least twenty days before each progress payment is scheduled (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3. CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

Review of Applications for Progress Payment:

14.4. ENGINEER will, within ten days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER, or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application. Ten days after presentation of the Application for Payment with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

14.5. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a

representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the Work in progress as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or OWNER to withhold payment to CONTRACTOR.

14.6. ENGINEER's recommendation of final payment will constitute an additional representation by ENGINEER to OWNER that the conditions precedent to CONTRACTOR's being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

14.7. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1. the Work is *defective*, or completed Work has been damaged requiring correction or replacement,

14.7.2. the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3. OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4. of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling

OWNER to a set-off against the amount recommended, but OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action.

Substantial Completion:

14.8. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9. OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10. Use by OWNER of any finished part of the Work, which has specifically been identified in the Contract Docu-

ments, or which OWNER, ENGINEER and CONTRACTOR agree constitutes a separately functioning and useable part of the Work that can be used by OWNER without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.10.2. OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.10.3. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

Final Inspection:

14.11. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents—all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any Subcontractor or Supplier fails to furnish a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

Final Payment and Acceptance:

14.13. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation—all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.16.

Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

14.14. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Contractor's Continuing Obligation:

14.15. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by OWNER, nor any act of acceptance by OWNER nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13, nor any correction of defective Work by OWNER will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.16).

Waiver of Claims:

14.16. The making and acceptance of final payment will constitute:

14.16.1. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.11 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights in respect of

CONTRACTOR's continuing obligations under the Contract Documents; and

14.16.2. a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15—SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work:

15.1. OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

Owner May Terminate:

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2. if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3. if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4. if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors;

15.2.5. if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6. if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents

(including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.9 as revised from time to time);

15.2.7. if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8. if CONTRACTOR disregards the authority of ENGINEER; or

15.2.9. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if there be one) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) such excess will be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such costs incurred by OWNER will be approved as to reasonableness by ENGINEER and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4. Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, CONTRACTOR shall be paid for all Work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to, direct, indirect and consequential costs (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs).

Contractor May Stop Work or Terminate:

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or OWNER has failed to make any payment as aforesaid, CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

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ARTICLE 16—ARBITRATION

16.1. All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of, or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.16) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining subject to the limitations of this Article 16. This agreement so to arbitrate and any other agreement or consent to arbitrate entered into in accordance herewith as provided in this Article 16 will be specifically enforceable under the prevailing law of any court having jurisdiction.

16.2. No demand for arbitration of any claim, dispute or other matter that is required to be referred to ENGINEER initially for decision in accordance with paragraph 9.11 will be made until the earlier of (a) the date on which ENGINEER has rendered a decision or (b) the tenth day after the parties have presented their evidence to ENGINEER if a written decision has not been rendered by ENGINEER before that date. No demand for arbitration of any such claim, dispute or other matter will be made later than thirty days after the date on which ENGINEER has rendered a written decision in respect thereof in accordance with paragraph 9.11; and the failure to demand arbitration within said thirty days' period shall result in ENGINEER's decision being final and binding upon OWNER and CONTRACTOR. If ENGINEER renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned. No demand for arbitration of any written decision of ENGINEER rendered in accordance with paragraph 9.10 will be made later than ten days after the party making such demand has delivered written notice of intention to appeal as provided in paragraph 9.10.

16.3. Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the

American Arbitration Association, and a copy will be sent to ENGINEER for information. The demand for arbitration will be made within the thirty-day or ten-day period specified in paragraph 16.2 as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

16.4. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity (including ENGINEER, ENGINEER's agents, employees or consultants) who is not a party to this contract unless:

16.4.1. the inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration,

16.4.2. such other person or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and

16.4.3. the written consent of the other person or entity sought to be included and of OWNER and CONTRACTOR has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

16.5. The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and will not be subject to modification or appeal except to the extent permitted by Sections 10 and 11 of the Federal Arbitration Act (9 U.S.C. §§10,11).

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ARTICLE 17—MISCELLANEOUS

Giving Notice:

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Time:

17.2.1. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

General:

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omis-

sion or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.4. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.30, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.

SUPPLEMENTARY CONDITIONS

NOTE; These Supplementary Conditions amend or supplement the General Conditions of the Construction Contract (No. 1910-B, 1983 ed.) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

ARTICLE 1 - DEFINITIONS

The terms used in these Supplementary Conditions which are defined in the General Conditions of the Construction Contract have the same meanings assigned to them as in the General Conditions.

Approved, or Equal - The words "approved" or "equal", or other equivalent words used in these Specifications or in the Contract shall be understood to mean that said device, part or construction is to be approved by and shall be to the satisfaction of the Owner and Engineer, prior to its manufacture or placing in the Work.

Award - The decision of Owner to accept the Bid of the lowest and/or most qualified responsible Bidder for the Work, subject to the execution and approval of a satisfactory contract therefore and bond to secure the performance thereof, and to such other conditions as may be specified or otherwise required by law.

Bid Bond - The security designated in the Bid to be furnished by the Bidder as a guarantee that said Bidder will enter into a Contract with the Owner for the acceptable performance of the Work and will furnish the required performance bond, if the Work is awarded to him.

Completion Affidavit - The affidavit signed by the Contractor stating that the Work has been completed.

Contract - The word "contract" is synonymous with the word "agreement".

Permanent Easement - A permanent easement is a permanent right-of-way to use a described parcel of land for the purpose to construct, operate, control, maintain, reconstruct, and remove a utility line and appurtenances along, under and across said easement.

Progress Payment - The phrase "application for Progress Payment" is synonymous with the phrase "periodic estimate for partial payment".

Plans - The word "plans" is synonymous with the word "drawings".

Proposal - The word "proposal" is synonymous with the word "bid".

Right-of-Way - The areas existing or acquired by permanent easement for the right of passage, i.e., a railroad for tracks, a public road, use of a utility for its services, or drainage purposes such as overland swale or enclosed conduit.

Shall - The word "shall" when used in these Contract Documents is mandatory.

Temporary Easement - A temporary easement is a temporary use of a land for the purposes of constructing and placing in operation a utility and its appurtenances. The temporary easement usually expires shortly after completion of the Work, generally within one year of adoption.

ABBREVIATIONS

The following organizations are referred to in these Contract Documents by abbreviations of their titles.

ASTM - American Society for Testing and Materials
AWWA - American Water Works Association
ACI - American Concrete Institute
AASHO - American Association of State Highway Officials
ANSI - American National Standards Institute
ASA - American Standards Association

ARTICLE 2 -PRECONSTRUCTION

2.1 COMMENCEMENT OF CONTRACT TIME

The third sentence of paragraph 2.3 of the General Conditions has been deleted because of the nature of the funding for the project. Owner may need more time than the deleted 75 days in order to finalize funding for the project.

2.2 SCHEDULES

The Contractor shall be prepared to discuss, in detail, the proposed construction schedule for this project. See General Conditions, Paragraph 2.6 for the requirements concerning the submission of a progress schedule, shop drawing submittal schedule, and a preliminary schedule of values (the schedule for progress payments to the contractor during construction).

2.3 PRE-CONSTRUCTION CONFERENCE

After a notice of award of contract has been sent to the Contractor, a Pre-Construction Conference will be scheduled.

ARTICLE 3 - CONTRACT DOCUMENTS; INTENT AND REUSE

INTENT;

The intent of the Plans and Specifications is to prescribe the outline of the Work which the Contractor undertakes to do in full compliance with the Contract. He shall furnish all required materials, equipment, tools, labor and incidentals, unless otherwise provided in the Contract, and shall include the cost of these items in the unit price bid for said unit of work.

No deviation from these Specifications or the appropriate Plans shall be permitted unless first approved in writing by the Landscape Architect and/or Owner.

The fact that specific mention of a fixture, or of any part of Work, is omitted in the Specifications, whether intentionally or otherwise, when the same is clearly shown or indicated on the Drawings, or is usually and customarily required to fully complete such work as is specified herein, will not entitle the Contractor to consideration in the matter of any claim for extra compensation, but the said fixtures or work or both, must be installed or done the same as if called for by both Drawings and Specifications.

Only figured dimensions on the Drawings will be used by the Contractor. Where the work of the Contractor is affected by finish dimensions, those shall be determined by the Contractor at the site, and the Contractor shall assume the

responsibility therefore.

Wherever the letters "A.S.T.M." are used in these Specifications, it shall be understood as referring to the American Society for Testing and Materials. When reference is made to a certain Designation Number of a specification or test as set out or given by the American Society for Testing and Materials, it shall be understood to mean the current, up-to-date standard specification or tentative specification for that particular process, material, or test as currently published by that group.

The Contract Documents are defined in the General Conditions of this manual. These Contract Documents are intended to describe a complete work and are essential parts of the Contract. A requirement occurring in any of them is binding. In case of discrepancy, figured dimensions shall govern over scaled dimensions, plans shall govern over Specifications; and quantities shown on the Plans shall govern over those shown in the Bid. Neither the Owner nor Contractor shall take advantage of any apparent error or omission in the Plans or Specifications, and the Engineer shall be permitted to make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the Plans and Specifications.

The Contractor shall not assign the whole or any part of this Contract or any moneys due or to become due hereunder without written consent of the Owner. In case the Contractor assigns all or any part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations of services rendered or materials supplied for the performance of the Work called for in this Contract.

ARTICLE 4 - AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

REFERENCE POINTS

4.4 CONSTRUCTION CONTROL STAKES AND BENCHMARKS

Construction staking shall be performed by the Contractor. However, the Engineer will provide a limited amount of control stakes, and the Engineer will establish benchmarks for use by the Contractor.

The Contractor shall give 72 hours' notice when the control stakes are needed. The Contractor shall exercise proper care in the preservation of any stakes and benchmarks set by the Engineer. Control stakes and benchmarks will be set one time only. In the event that the Contractor was responsible for

the destruction or disturbance of control stakes and benchmarks, the Contractor shall compensate the Engineer for replacement of same. Compensation shall be at the rate of Engineer's payroll costs times as 3.0. multiplier.

ARTICLE 5 - BONDS AND INSURANCE

5.1 PERFORMANCE AND OTHER BONDS

- A. Bid Security is to be provided by each Contractor in the amount of five percent of his maximum bid price and will be in the form of: Bid Bond - the prescribed type of Bid Bond is attached.
- B. Performance Bond and Labor and Materials Bond each in an amount equal to the Contract Price.

5.3 CONTRACTOR'S LIABILITY INSURANCE

The limits of liability for the liability insurance required by Paragraph 5.3 of the General Conditions shall provide coverages for not less than the following amounts or greater where required by law, and the coverages under Paragraphs 5.4 and 5.5 shall be as follows:

- A. Workers Compensation, etc. under Paragraphs 5.3.1 and 5.3.2 of the General Conditions:
 - i. State: Statutory
 - ii. Applicable Federal (i.e. Longshoreman's): Statutory
 - iii. Employer's Liability \$500,000
- B. Comprehensive General Liability under Paragraphs 5.3.3 and 5.3.5 of the General Conditions (including Premises-Operations; Independent Contractors' Protection; Products & Completed Operations; Broad Form Property Damage):
 - i. Bodily Injury:
 - \$500,000 Each Occurrence
 - \$1,500,000 Annual Aggregate, Products & Completed Operations
 - ii. Property Damage:
 - \$250,000 Each Occurrence
 - \$750,000 Annual Aggregate
 - iii. Property Damage Liability Insurance will provide Explosion, Collapse and Underground Coverages:yes

- iv. Personal Injury, with employment exclusion deleted:

\$1,500,000	Annual Aggregate
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- C. Comprehensive Automobile Liability under Paragraph 5.3.6. of the General Conditions:
 - i. Bodily Injury:

\$500,000	Each Person
\$500,000	Each Accident
 - ii. Property Damage:

\$250,000	Each Occurrence
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- D. Contractual Liability under Paragraph 5.4 of the General Conditions:
 - i. Bodily Injury:

\$500,000	Each Occurrence
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 - ii. Property Damage:

\$250,000	Each Occurrence
\$750,000	Annual Aggregate
- F. Other Insurance Requirements: In addition to the above, the Contractor's Liability and Property Damage Insurance shall provide adequate protection against the following hazards:
 - 1. Damage to existing and adjacent structures
 - 2. Damage to underground utilities
 - 3. Damage due to flooding
 - 4. Damage due to sewer trench cave-ins
- G. The above limits for Contractor's insurance may be satisfied by any combination of limits from both primary liability policies and excess liability (umbrella) policies.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

SUPERVISION AND SUPERINTENDENCE

6.2 Contractor's resident superintendent shall be English-speaking.

A phone number shall be furnished to the Landscape Architect and Owner of a responsible representative of the Contractor who may be reached if emergencies arise during off-work hours.

LABOR, MATERIALS AND EQUIPMENT

6.5 It is understood that except as otherwise specifically stated in Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete and deliver the Work within the specified time.

Any work necessary to be performed after regular working hours, on Sundays or Legal Holidays shall be performed without additional expense to the Owner.

The Contractor shall employ only competent and efficient superintendent, laborers, mechanics, or artisans. Whenever, in the opinion of the Landscape Architect any employee is careless, incompetent, obstructs the progress of the Work, acts contrary to the instructions, or conducts himself improperly, the Contractor shall, upon the written request of the Owner, remove him from the work site.

It is the intent of the Specifications that first-class equipment and materials shall be used throughout the Work, and that they shall be incorporated in such a manner as to provide completed construction which is workmanlike and acceptable in every detail. The cost of collecting and furnishing of all test materials for samples shall be borne by the Contractor and considered as part of the Project Cost. Only equipment and materials which conform to the requirements of these Specifications shall be incorporated in to the work.

6.8 CONCERNING SUBCONTRACTORS, SUPPLIERS AND OTHERS

If the Contractor sublets the whole or any part of the Work to be done under the Contract, he shall not, under any circumstances, be relieved of his liabilities and obligations. All transactions of Landscape Architect or Owner shall be with the Contractor; subcontractor shall be recognized only in the capacity of employees or workmen and shall be subject to the same requirements as to character and competence. The Contractor shall not assign, transfer, convey, sell, or otherwise dispose of the whole or any part of his Contract, his right, title, or interest therein, or his power to execute such Contract, to any person, firm partnership or corporation without written consent of the Engineer.

The Contractor will insert in any subcontracts the Federal Labor Standards Provisions contained herein and such other clauses as the Department of Housing and Urban

Development may, by instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

6.14 LAWS AND REGULATIONS

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein. If, through mistake or otherwise, any such provision is not inserted or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion. This shall include, but not be limited to, the Occupational Safety and Health Act of 1970, and the Equal Employment Opportunity Act of 1965, including all revisions.

6.17 USE OF PREMISES

From day to day, or as may be ordered by the Landscape Architect or Owner, and immediately after completion of the work, the Contractor shall, at his own expense, clean up and remove all refuse and unused materials of any kind resulting from the work. Upon failure to do so within five (5) calendar days after written request, the work may be done by the Owner and cost thereof be charged to the Contractor and be deducted from his next estimate. Upon completion of the work, the Contractor shall remove all his equipment and put the area of the work in a neat and clean condition, and do all other cleaning required to complete the work in a workmanlike manner, ready for use and satisfactory to the Owner.

All clean-up and restoration shall be performed as detailed in the various sections of these Contract Documents.

6.19 RECORD DOCUMENTS

Contractor shall assist the Landscape Architect in the preparation of Record Drawings. When requested by Landscape Architect the Contractor shall supply the necessary manpower to assist the Landscape Architect in making field measurements for these Record Drawings.

SAFETY AND PROTECTION

6.20 PUBLIC CONVENIENCE AND SAFETY

The Contractor shall, at all times, so conduct his Work

as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the Work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission and supervision of the proper authorities. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Provisions shall be made by the Contractor to insure the use of sidewalks and the proper functioning of all gutters, sewer inlets, drainage ditches, irrigation ditches and field tile.

In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by his operations during the performance of the Work. This requirement will apply continuously, 24 hours per day, until acceptance of the Work by the Owner, and shall not be limited to normal working hours. The Contractor shall supply to the Owner and Landscape Architect a 24-hour phone number for emergency calls regarding the Project under construction. The duty of the Landscape Architect is to conduct construction review of the Contractor's performance and is not intended to include review of the adequacy of the Contractor's safety measure in, on, or near the construction site.

BARRICADES AND WARNING SIGNS

The Contractor shall provide, according to the Indiana Manual on Uniform Traffic Control Devices standards, adequate signs, barricades, warning lights and watchmen; and take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be protected at night by suitable signal lights which shall be kept burning from sunset to sunrise. Barricades shall be of substantial construction and shall be painted such as to increase their visibility at night. Suitable warning signs shall be so placed and illuminated at night as to show in advance where construction, barricades, or detours exist. Contractor shall provide flagmen for areas, as needed. The cost of furnishing and maintaining barricades, warning signs, red flags, and torches or lights as required herein shall be incidental to the Contract and no extra compensation will be allowed.

DEBRIS ON TRAVELED SURFACE OR STRUCTURES

Where the Contractor's equipment is operated on any portion of the traveled construction, the Contractor shall clean up traveled surface of all dirt and debris at the end of each day's operations, or as directed by the

Landscape Architect to insure the safety of vehicular traffic during such construction. The cost of this Work shall be considered incidental to the Contract, and no extra compensation will be allowed.

EQUIPMENT ON TRAVELED SURFACE OR STRUCTURES

The traveled surface and structures on or adjacent to the Work shall be protected, in a manner satisfactory to the Landscape Architect from damage by lugs or cleats on treads of wheels of equipment.

All equipment used in the execution of the Work shall comply with the legal loading limits established by the Statutes of the State of Indiana or local regulations when moved over or operated on any traveled surface or structure, unless permission in writing has been issued by the Engineer. Before using any equipment which may exceed the legal loading, the Contractor shall secure a permit allowing ample time for making an analysis of stresses to determine whether or not the proposed loading would be within safe limits. The Owner will not be responsible for any delay in construction operations or for any costs incurred by the Contractor as a result of compliance with the above requirements.

USE OF EXPLOSIVES

When the use of explosives is necessary for the execution of the Work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible and licensed for all damage resulting from the placement and use of explosives.

The Contractor shall notify in writing all public utility companies, hospitals or industries having structures in proximity to the site of the Work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they shall in no way relieve the Contractor of his responsibility for damage to the structures.

USE OF FIRE HYDRANTS AND BURNING

If the Contractor desires to use water from hydrants, he shall make application to the proper authorities and shall conform to their ordinances, rules or regulations and costs, if any, concerning their use. Water, when furnished from City-owned hydrants, shall be done at the direction of the Water Utility Superintendent.

Fire hydrants shall be accessible at all times to the Fire Department. No material or other obstructions shall

be placed closer to a fire hydrant than permitted by municipal ordinances. rules or regulations.

The Contractor shall be responsible for obtaining any permission and necessary permits prior to commencement of any burning, and copies sent to the Landscape Architect.

PROTECTION & RESTORATION OF PROPERTY

If corporate or private property located outside or adjacent to existing rights-of-way or easements interferes with the Work, the Contractor shall notify the owners of such property in writing, advising them of the nature of the interference and shall arrange to cooperate with them for the protection or disposition of such property. The Contractor shall furnish the Landscape Architect with copies of such notifications and with copies of any agreements between him and the property owners concerning such protection or disposition.

The Contractor shall take all necessary precautions for the protection of corporate or private property, such as walls and foundations of buildings, vaults, underground structures of public utilities, underground drainage facilities, overhead structures of public utilities, trees, shrubbery, crops, fences contiguous to the Work, of which the Contract does not provide for removal. The Contractor shall protect and carefully preserve all official survey monuments, or other similar monuments, until the Owner or an authorized surveyor or agent has witnessed or otherwise referenced their location or relocation. The Contractor shall notify the Landscape Architect of the presence of any such survey or property monuments as soon as they are discovered. The Contractor shall be responsible for the damage or destruction of property of any character, and such responsibility shall not be released until the Work shall have been completed and accepted and the requirements of the Specifications complied with.

Whenever public or private property is so damaged or destroyed, the Contractor shall, at his own expense, restore such property to a condition equal to that existing before such damage or injury was done, by repairing, rebuilding, or replacing it as may be directed; or he shall otherwise make good such damage or destruction in an acceptable manner. If he fails to do so, the Landscape Architect may, after the expiration of a period of forty-eight(48) hours after giving him notice in writing to proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof shall be deducted from any compensation due, or which may become due, the Contractor under his Contract.

The Contractor shall remove all mailboxes within the limits of construction which interfere with construction operations and shall erect them at temporary locations, in concurrence with the Postal Authority.

As soon as construction operations permit, he shall set the mailboxes at their permanent locations. This work shall be performed as directed by the Landscape Architect. The Contractor shall replace, at his own expense, any mailbox or post which has been damaged by his operations.

The cost of all materials required and all labor necessary to comply with the above provisions will not be paid for separately, but shall be considered as incidental to the Contract, and no extra compensation will be allowed.

PROTECTION & RESTORATION OF TRAFFIC SIGNS

Any traffic sign within the limits of construction which interferes with construction operations may be removed by the Contractor when authorized by, Landscape Architect, or upon approval of the local traffic authority.

Any traffic sign which has been removed shall be re-erected by the Contractor and as soon as construction operations permit, the sign shall be set at its permanent location. The Contractor shall replace any traffic sign or post which has been damaged due to his operations. The cost of all materials required and all labor necessary to comply with this provision will not be paid for separately but shall be considered as incidental to the Contract.

PROTECTION OF WORK FROM WEATHER CONDITIONS

In the event of temporary suspension of Work, or during inclement weather, or whenever the Landscape Architect shall direct, the Contractor will, and will cause his subcontractors to protect carefully his and their Work and materials against damage or injury from the weather. If, in the opinion of the Landscape Architect, any Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors so to protect his Work, such materials shall be removed and replaced at the expense of the Contractor.

PROTECTION OF LIVES

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or

property, either on or off the site, which occur as a result of his prosecution of the Work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by Chapter XIII, Bureau of Labor Standards, Department of Labor, Part 1518, Safety and Health Regulations for Construction, as outlined in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971. Title 29 - LABOR, shall be observed.

PROTECTION OF HEALTH

The Contractor shall provide and maintain such sanitary accommodations for the use of his employees and those of his subcontractors as may be necessary to comply with the requirements and regulations of the local and State Departments of Health.

SHOP DRAWINGS AND SAMPLES

6.23 Contractor's Certification: When submitted for the Landscape Architect for review, shop drawings shall bear the Contractor's certification that he has reviewed, checked and approved the shop drawings; that they are in harmony with the requirements of the Project and with the provisions of the Contract Documents; and that he has verified all field measurements and construction criteria, materials, catalog numbers and similar data. Contractor shall also certify that the Work represented by the shop drawings is recommended by the Contractor, and the Contractor's Guaranty will fully apply.

The cost of furnishing shop drawings shall be incidental to the Contract, and no additional compensation will be allowed the Contractor for any delays resulting therefrom.

6.24 Samples shall be furnished by the Contractor at his expense and may be used in the Work after acceptance. Testing of samples and materials shall be arranged and paid for by the Contractor and/or supplier of said materials. Landscape Architect may request samples on any material at any time. Refusal or delay by Contractor in providing samples could result in delay of partial payments and/or rejection of all Work pertinent to the sample.

6.33 CONCRETE TESTING EQUIPMENT

The Contractor shall make available to the Landscape Architect the following equipment for testing concrete:

1. Slump cone
2. Air testing equipment

This testing equipment shall be made available at each site where concrete work will be done.

6.34 REMOVAL OF EQUIPMENT, TOOLS AND SUPPLIES

At the termination of this Contract, before acceptance of the Work by the Owner, Contractor shall remove all of his equipment, tools and supplies from the project site. Should the Contractor fail to remove such equipment, tools and supplies, the Owner shall have the right to remove them at the expense of the Contractor.

ARTICLE 7 WORK BY OTHERS

7.5 COOPERATION WITH UTILITIES

Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and other utility appurtenances which would permanently interfere with the proposed construction will be moved at no expense to the Contractor, except as otherwise provided for in the Contract Documents or as noted on the Plans.

It is understood and agreed that the Contractor has considered in his Bid all of the permanent and temporary utility appurtenances in their present positions and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him.

7.6 If separate contracts are let for Work comprising an entire improvement each Contractor shall conduct his work so as not to interfere with or hinder the progress or completion of the Work being performed by other contractors. In case of dispute, the Landscape Architect and/or Owner shall be the referee, and this decision shall be final and binding upon all, without additional compensation to either.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

(No Supplementary Conditions to this Article).

ARTICLE 9 - LANDSCAPE ARCHITECTS STATUS DURING
CONSTRUCTION

9.1 The duties, responsibilities, and limitations of authority of the Landscape Architect as Project Representative are as follows:

- a. Periodic monitoring to observe the performance of the Work of the Contractor.
- b. Periodic checks of materials and equipment used by the Contractor to further protect the Owner against defects and deficiencies in the Work; but the furnishing of such services will not make the Landscape Architect responsible for or give the Landscape Architect control over construction methods, means, techniques, sequences or procedures or for safety precautions or programs, or responsibility for Contractor's failure to perform the Work in accordance with the Contract Documents.
- c. Monitoring and inspection duties and responsibilities of the Landscape Architect are limited to the Landscape Architect's agreement with the Owner and in the Contract Documents. The Owner will also be providing project monitoring and will contact the Landscape Architect upon observation of items requiring the Landscape Architects inspection; at Substantial Completion; at Final Inspection; and at Applications for Payment.
- d. Periodic review of schedules and progress of work.
- e. Conferences & meetings: Attend meetings with Contractors such as pre-construction, progress meeting, job conferences, and other project-related meetings, and prepare and circulate copies of minutes thereof.
- f. Receive and record Shop Drawings and samples. Advise Contractor and/or Owner that a Shop Drawing or Sample is required to commence an item of Work.
- g. Report to Owner any Work that is observed to be unsatisfactory, faulty, defective, or does not conform with Contract Documents, or has been damaged requires testing for Approvals. Owner will direct the Landscape Architect to advise the Contractor of the action to be undertaken. The Contractor will present evidence to the Landscape Architect that the Work, a corrective measure, or test has been performed.
- h. Accompany (when available) visiting inspectors

representing public or other agencies having jurisdiction over the Project, record the results and report to the Owner for distribution.

- i. Interpret Contract Documents, report these clarifications and interpretations to the Owner and Contractor.
- j. Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report to Owner. Transmit to Contractor decisions of the Owner.
- k. Maintain files for correspondence; reports of job conference; Shop drawings and samples; reproductions of Contract Documents including Directive Changes, Addenda, Changes Orders, Field Orders, Clarifications, Interpretations, Progress Reports.

Incidental notes will be recorded on Contractor (s) present at the site, weather conditions, and other activities observed.

- l. Draft proposed Change Orders, and obtain backup data from Contractor.
- m. Review payment requests and forward with recommendations to the Owner on level of completion of the Work, and materials and equipment delivered at the site but not yet incorporated in the work.
- n. Receive certificates, maintenance, and operation manuals and other data required to be installed, assembled, and furnished by the Contractor. Review and forward this material to the Owner with any recommendations.
- o. At the request of the Contractor and Owner, conduct inspections at Substantial Completion and Final Inspection. Observe that final items have been completed or corrected and make recommendations to the Owner.
- p. Shall not:
 1. Exceed authority of Contract Documents.
 2. Undertake responsibilities of Contractor, subcontractors, or Contractor's superintendent.
 3. Accept Shop Drawings from any one other than the Contractor.
 4. Authorize Owner to occupy the project in whole or in part.
 5. Participate in or conduct specialized field or laboratory tests or inspections unless as

specifically authorized by the Owner and Contract Documents.

ARTICLE 10 - CHANGES IN THE WORK

(No Supplementary Conditions to this Article.)

ARTICLE 11 - CHANGE OF CONTRACT PRICE

11.3 EXCEPTION; Should the project Contractor's estimated price to perform the extra work be determined excessive by Owner and/or Engineer, Owner reserves the right to obtain an estimate from an outside contractor to do the work. Should this estimate be found to be more reasonable, Owner may order the work done by the outside contractor and billed directly to the project Contractor who will, in turn, pay the outside contractor and invoice Owner for that exact amount.

~~11.9.3 Paragraph 11.9.3 of the General Conditions is hereby deleted in its entirety and the following is substituted in its place:~~

~~11.9.3.1 If the total cost (including the variation from the original bid cost) of a particular item of Unit Price Work amounts to 5% or more of the Contract Price, and the variation in the quantity of the particular item of Unit Price Work performed by Contractor differs by more than 20% from the estimated quantity of such item indicated on the Bid Form; and~~

~~11.9.3.2 If there is no corresponding adjustment with respect to any other item of Work; and~~

~~11.9.3.3 If Contractor believes that the Contractor has incurred additional expense as a result thereof; or~~

~~11.9.3.4 If Owner believes that the quantity variation entitles it to an adjustment of the unit price, then~~

~~either Owner or Contractor may make a claim for an adjustment in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.~~

ARTICLE 12 - CHANGE OF CONTRACT TIME

(No Supplementary Conditions to this Article.)

ARTICLE 13 - WARRANTY & GUARANTEE: TESTS & INSPECTIONS;
CORRECTION, REMOVAL OR ACCEPTANCE OF
DEFECTIVE WORK

WARRANTY & GUARANTEE:

13.1 The Contractor shall warrant all materials and equipment furnished and Work performed for a period of one (1) year from the date of final acceptance in writing by Owner.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

APPLICATION FOR PROGRESS PAYMENT

14.2 Retainage.

The amount of Retainage withheld by Owner from the Progress Payments will be 5% for the entire Project, as provided in Indiana Code 5-16-5.5-3.5. The retainage can be, at the Contractor's request, placed in an escrow account with a bank, savings and loan institution, or the State of Indiana, or an instrumentality thereof, as provided in I.C. 5-16-5.5-3. The escrow agent shall promptly invest all escrowed principal in income-bearing obligations. The escrow agent shall release the escrowed principal and interest to the Contractor according to the terms of the escrow agreement.

14.8 SUBSTANTIAL COMPLETION

When the Contractor considers the entire Work ready for its intended use, the Contractor shall notify Owner in writing by submitting a Completion Affidavit of the form of the Completion Affidavit contained in this Project Manual. Contractor may include with the Completion Affidavit a list of items that are incomplete. Contractor shall request in writing that the Landscape Architect issue a Certificate of Substantial Completion.

Landscape Architect will not issue a Certificate of Substantial Completion (and a punch list of final items to be completed) until the Contractor has substantially completed the Work and submitted a Completion Affidavit.

14.10.1 PARTIAL UTILIZATION

If Owner requests from the Contractor to permit Owner to use any such part of the Work which Owner believes to be ready for its intended use and substantially complete, the Contractor (if the Contractor agrees) will certify to Owner and Landscape Architect that said part of the Work is substantially complete by submitting a Completion Affidavit for said part of the Work.

14.13 FINAL PAYMENT AND ACCEPTANCE

When the Contractor has completed the Work in accordance with the terms of the Contract Documents, he shall certify completion of the Work to the Owner and submit a final Request for Payment, which shall be the Contract Amount plus all approved additions, less all approved deductions, and less previous payments made. The Contractor shall furnish evidence that he has fully paid all debts for labor, materials and equipment incurred in connection with the Work. Upon acceptance by Owner, Owner will release the Contractor except as to the conditions of the Performance Bond and the Labor and Material Payment Bond, any legal rights of Owner, required guarantees, and Correction of Faulty Work after Final Payment, and will pay the Contractor's final Request for Payment. The Contractor shall allow sufficient time between the time of completion of the Work and approval of the final Request for Payment for Landscape Architect to assemble and check the necessary data.

The Contractor shall deliver to Owner a complete release of all liens arising out of this Contract before the retained percentage of before the final Request for Payment is paid. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to Owner such amounts as Owner may have been compelled to pay in discharging such liens, including all costs and a reasonable attorney's fee.

The final payment, including all escrowed principal and escrowed income, subject to the deductions provided herein, shall become due within sixty-one (61) days following the date of Substantial Completion, as provided in I.C. 1971, 5-16-5.5

If at that time, there are any remaining uncompleted minor items, an amount equal to two hundred percent (200%) of the value of each item, as determined by Landscape Architect, shall be withheld until said item or items are completed.

The Contractor, within ten (10) days of the receipt of any payment by Owner's agency and/or escrow agent, shall pay all subcontractors and/or direct the escrow agent to pay all subcontractors with whom the Contractor has contracted, their share of the payment the Contractor received, based upon the service performed by the subcontractor, including escrowed principal and income, if any. The Contractor shall require each subcontractor to make similar payments to his subcontractors. The Contractor shall furnish, upon request, a sworn statement of certification last the time of payment to him that the

subcontractor has received his share of the payment.

14.17 METHODS OF MEASUREMENT AND PAYMENT

It is the intent of this section of the Supplemental Conditions to provide further clarification of the methods of measurement and payment for the various items in the Bid Form. In the unit price contracts, all items will be paid for based on actual units installed, with the exception of the plan quantity. Plan quantities are those items that will not be measured, and payment will be based upon the quantities listed in the Bid Form. The Bidder shall be given until ten days before the Bid opening to question the plan quantities. All questions about plan quantities shall be submitted to Landscape Architect in writing. Replies will be issued by addenda, mailed or delivered to all parties recorded by Landscape Architect as having received bidding documents. Questions received less than ten days prior to the date for opening of Bids will not be answered.

SPECIAL REQUIREMENTS

1. Any item specified may be substituted with an equal approved by the Owner.
2. Gabions baskets shall be Maccaferri zinc coated Type I, and shall be paid for on a square yard basis.
3. Gabions shall be installed and filled with rip rap, and placed as per instructions in Appendix.
4. Filter fabric shall be Polyfelt Geotextiles grade TS 700, placed as per manufacturers instructions, as available from NuTec Supply, Indianapolis, IN, (317) 546-6340.
5. Rip rap shall be limestone revetment rip rap IDOH sections 616.02 (b); 903.02(a).
6. Control points will be set by Engineer for use by Contractor for Field Engineering.
7. Fence shall be Type 2 wire (high tensile); 12 1/2 gauge; 200,000 # tensile strength Class C galvanized carrying 20 year warranty. Posts shall be CCA Southern Yellow Pine, 8' corner, and 7' line.
8. Field density tests may be required by the Engineer at no cost to the Owner.
9. Erosion Control materials shall be as shown in the Appendix.
10. Restoration consists of shaping, grading, seeding, and mulching designated areas that have been disturbed by Construction activities.
11. In the event that existing field tile drainage is encountered or discovered during the work, Construction Specification 46 (SCS-NEH 20), Tile Drains for Land Drainage, will be engaged. No Bid Item is scheduled for this specification. Work will consist of reporting to the Owner, repair, and rerouting to drain at the direction of the Owner and/or Engineer. Compensation will be negotiated per instance and made by the Owner as a change in the Contract Price.

SPECIAL REQUIREMENTS TO LANDSCAPE CONSTRUCTION

Seed Mixture No. 1. (for turf grass areas)

Baron Kentucky Bluegrass	30% by weight	85% germination
Kenblu Kentucky Bluegrass	30%	85%
Pennfine Perennial Ryegrass	20%	85%
Pennlawn Red Fescue	20%	85%

Application rate: 5 pounds per 1,000 square feet in straw mulch.

Seed Mixture No. 2. (field - turf grass areas)

Orchardgrass	20% by weight
Timothy	15%
Red clover	5%
Proso Millet	20%
Pennfine Perennial Ryegrass	20%
Annual ryegrass	20%

Application rate: 120 pounds per acre

- no mulch

Seed Mixture No. 3. (embankment/erosion control)

Perennial Ryegrass	20% by weight
Kentucky 31 Fescue	30%
Korean Lespedeza	15%
Annual ryegrass	20%
Orchardgrass	15%

Application rate: 150 pounds per acre, erosion control material applied over seeding.

SPECIFICATIONS

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide such field engineering services beyond those controls established by the Engineer as are required for proper completion of the Work including, but not necessarily limited to:
 - 1. Establishing and maintaining lines and levels;
 - 2. Structural design of shores, forms, and similar items provided by the Contractor as part of his means and methods of construction.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions.
 - 2. Additional requirements for field engineering also may be described in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

- A. Upon request of the Engineer, submit:
 - 1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
 - 2. Documentation verifying accuracy of field engineering work.
 - 3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance or nonconformance with requirements of the Contract Documents.

1.4 PROCEDURES

- A. In addition to procedures directed by the Contractor for proper performance of the Contractor's responsibilities:
 - 1. Locate and protect control points before starting work on the site.
 - 2. Preserve permanent reference points during

- progress of the Work.
3. Do not change or relocate reference points or items of the Work without specific approval from the Engineer.
 4. Promptly advise the Engineer when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.

1.5 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. No measurement will be made for work required in this section.
- B. Include in the contract sum an amount sufficient to cover all cost for field engineering. This is Bid item 1.

SECTION 01201

PRE-CONSTRUCTION CONFERENCE

PART 1 - GENERAL

.1 DESCRIPTION

- A. Work included: To help clarify construction contract administration procedures, the Engineer will conduct a Preconstruction Conference prior to start of the Work. Provide attendance by the designated personnel.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions.

.2 QUALITY ASSURANCE

- A. For those persons designated by the Contractor, his subcontractors, and suppliers to attend the Preconstruction Conference, provide required authority to commit the entities they represent to solutions agreed upon in the Conference.

.3 SUBMITTALS

- A. To the maximum extent practicable, advise the Engineer at least 24 hours in advance of the Conference as to items to be added to the agenda.
- B. The Engineer will compile minutes of the Conference, and will furnish three copies of the minutes to the Contractor and required copies to the Owner. The Contractor may make and distribute such other copies as he wishes.

4 PRECONSTRUCTION CONFERENCE

- A. The Conference will be scheduled to be held within 15 working days after the Owner has issued the Notice to Proceed, but prior to actual start of the Work.
- B. Attendance:
 - 1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
 - 2. The Engineer will advise other interested parties, including the Owner and Lake Enhancement Staff, and request their attendance.
- C. Minimum agenda: Data will be distributed and discussed on:
 - 1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors,

- materials suppliers, and the Engineer;
- 2. Channels and procedures for communication;
- 3. Construction schedule, including sequence of critical work;
- 4. Contract Documents, including distribution of required copies of Drawings and revisions;
- 5. Processing of Shop Drawings and other data submitted to the Engineer for review;
- 6. Processing of field decisions and Change Orders;
- 7. Rules and regulations governing performance of the Work; and
- 8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.

CONSTRUCTION SPECIFICATION

1. CLEARING

1. SCOPE

The work shall consist of the clearing and disposal of trees, snags, logs, brush, shrubs, stumps, and rubbish from the designated areas.

2. CLASSIFICATION

Unless otherwise specified in Section 7, clearing will be classified according to the following definitions:

Class A clearing requires that trees and other woody vegetation be cut off so that the remaining stumps extend no higher than 4 inches above the ground surface.

Class B clearing requires that trees and other woody vegetation be cut off so that the remaining stumps extend no higher than 12 inches above the ground surface.

Class C clearing requires that trees and other woody vegetation be cut off as near the ground surface as conventional tools or field conditions will permit, or as specified in Section 7 of this specification.

3. MARKING

The limits of the areas to be cleared will be marked by means of stakes, flags, tree markings or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunks at a height of about 6 feet above the ground surface.

4. CLEARING

All trees not marked for preservation and all snags, logs, brush, and rubbish shall be cleared from within the limits of the marked areas.

5. DISPOSAL

All materials cleared from the designated areas shall be disposed of in the locations and in the manner shown on the drawings, or as specified in Section 7 of this specification.

6. MEASUREMENT AND PAYMENT

Method 1 For items of work for which specific unit prices are established in the contract, the cleared area will be measured to the nearest 0.1 acre. Payment for clearing will be made for the total area within the designated limits at the contract unit price for the specified class of clearing. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 2 For items of work for which specific unit prices are established in the contract, the length of the cleared area will be measured to the nearest full station (100 feet) along the line designated on the drawings or in the specifications. Payment for clearing will be made for the total length within the designated limits at the contract unit price for the specified class of clearing. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to completion of the work.

Method 3 For items of work for which specific unit prices are established in the contract, the cleared areas will be measured within the specified limits to the nearest 0.1 acre.

The cleared areas will be determined by measuring the width cleared, within the specified limits, at representative sections and multiplying the average width between sections by the linear distance between sections. Payment for clearing will be made at the contract unit price for the item and shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 4 For items of work for which specific lump sum prices are established in the contract, payment for clearing will be made at the contract lump sum prices. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to completion of the work.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item 3, Clearing

- (1) This item consists of clearing the areas shown on the plans or described by the Engineer.
- (2) Disposal made to the areas shown on the plans and burned.
- (3) Construction work shall continue expeditiously after clearing.
- (4) In Section 6, MEASUREMENT AND PAYMENT, Method 4 shall apply.
- (5) Clearing & Grubbing, Specification 2 is subsidiary to this item.
- (6) Payment includes compensation for mobilization and disposal.
- (7) Structure removal, specification 3, is subsidiary to this item.

CONSTRUCTION SPECIFICATION

2. CLEARING AND GRUBBING

1. SCOPE

The work shall consist of the clearing and grubbing of designated areas by removal and disposal of trees, snags, logs, stumps, shrubs and rubbish.

2. MARKING

The limits of the areas to be cleared and grubbed will be marked by means of stakes, flags, tree markings or other suitable methods. Trees to be left standing and uninjured will be designated by special markings placed on the trunks at a height of about six feet above the ground surface.

3. REMOVAL

All trees not marked for preservation and all snags, logs, brush, stumps, shrubs and rubbish shall be removed from within the limits of the marked areas. Unless otherwise specified, all stumps, roots and root clusters having a diameter of one inch or larger shall be grubbed out to a depth of at least two feet below subgrade elevation for concrete structures and one foot below the ground surface at embankment sites and other designated areas.

4. DISPOSAL

All materials removed from the cleared and grubbed areas shall be burned or buried at location shown on the drawings or as specified in Section 6 of this specification.

5. MEASUREMENT AND PAYMENT

Method 1 For items of work for which specific unit prices are established in the contract, the cleared and grubbed area will be measured to the nearest 0.1 acre. Payment for clearing and grubbing will be made for the total area within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the completion of the work.

Method 2 For items of work for which specific unit prices are established in the contract, the length of the cleared and grubbed area will be measured to the nearest full station (100 feet) along the line designated on the drawings or in the specifications. Payment for clearing and grubbing will be made for the total length

within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to completion of the work.

Method 3 For items of work for which specific unit prices are established in the contract, each tree, stump and snag having a diameter of 4 inches or greater and each log having a diameter of 4 inches or greater and a length of 10 feet will be measured prior to removal. The size of each tree and snag will be determined by measuring its trunk at breast height above the natural ground surface. The size of each log will be determined by measuring the butt and by measuring its length from butt to tip. The size of each stump will be measured at the top. Diameter shall be determined by dividing the measured circumference by 3.14.

Payment for clearing and disposal of each tree, stump and snag having a diameter of 4 inches or greater and each log having a diameter of 4 inches or greater and a length of 10 feet or greater will be made at the contract unit price for its size designation as determined by the following schedule:

<u>Measured Diameter</u>	<u>Size Designation</u>
4 inches to 8 inches	6-inch size
Over 8 inches to 12 inches	10-inch size
Over 12 inches to 24 inches	18-inch size
Over 24 inches to 36 inches	30-inch size
Over 36 inches to 60 inches	48-inch size
Over 60 inches	60-inch size

The sum of such payments shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to the work of completely clearing and grubbing the designated areas, including clearing, grubbing and disposal of smaller trees, stumps, snags and logs and brush, shrubs, roots and rubbish.

Method 4 For items of work for which specific lump sum prices are established in the contract, payment for clearing and grubbing will be made at the contract lump sum price. Such payment shall constitute full compensation for all labor, equipment, tools and all other items necessary and incidental to completion of the work.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 6 of this specification.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS.

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Subsidiary to Bid Item 3, Clearing

- (1) This item includes clearing and grubbing of stumps encountered within embankment and baffle site.
- (2) Compensation is included under Bid Item 3.

(3) AVOID CUTTING BELOW GRADES INDICATED OR DEEPER THAN NECESSARY/ AS SAND LAYERS MAY BE ENCOUNTERED. SEE ALSO SOILS REPORT IN APPENDIX .

CONSTRUCTION SPECIFICATION

3. STRUCTURE REMOVAL

1. SCOPE

The work shall consist of the removal, salvage and disposal of structures (including fences) from the designated areas.

2. MARKING

Method 1 Each structure unit to be removed will be marked by means of stakes, flags, painted markers or other suitable methods.

Method 2 The limits of the areas from which structures must be removed will be marked by means of stakes, flags or other suitable methods. Structures to be preserved in place or salvaged will be designated by special markings.

3. REMOVAL

Method 1 All structures designated in the contract for removal shall be removed to the specified extent and depth.

Method 2 Within the areas so marked all visible structures and attachments and all buried structures located and identified by survey stakes shall be removed to the specified extent and depth.

4. SALVAGE

Structures that are designated to be salvaged shall be carefully removed and neatly placed in the specified storage areas. Salvaged structures that are capable of being disassembled shall be dismantled into individual members or sections. Such structures shall be neatly match marked with paint prior to disassembly. All pins, nuts, bolts, washers, plates and other loose parts shall be marked or tagged to indicate their proper locations in the structure and shall be fastened to the appropriate structural member or packed in suitable containers. Materials from fences designated to be salvaged shall be placed outside the work area on the property from which they were removed. Wire shall be rolled into uniform rolls of convenient size. Posts and rails shall be neatly piled.

5. DISPOSAL OF REFUSE MATERIALS

Refuse materials resulting from structure removal shall be burned or buried at locations shown on the drawings or as specified in Section 7 of the specification.

6. MEASUREMENT AND PAYMENT

Method 1 For items of work for which specific unit prices are established in the contract, payment for the removal of each structure unit, except fences, will be made at the contract unit price. Fences removed or removed and salvaged will be measured to the nearest linear foot. Payment for fence removal or removal and salvage will be made at the contract unit prices appropriate to each type and size of fence.

Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 2 For items of work for which specific lump sum prices are established in the contract, payment for structure removal will be made at the contract lump sum price.

Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details are:

a. Subsidiary to Bid item 3, Clearing

- (1) This item includes removal of wire fence and posts as indicated on the plans, and as marked by Method 1, Section 2.
- (2) Dispose of removed materials by hauling from site to landfill.
- (3) In Section 3, Removal, Method 1, shall apply.
- (4) Payment includes compensation for mobilization and disposal.

CONSTRUCTION SPECIFICATION

5. POLLUTION CONTROL

1. SCOPE

The work shall consist of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air during construction operations in accordance with these specifications.

2. MATERIALS

All materials furnished shall meet the requirements of the Material Specifications listed in Section 8 of this specification.

3. EROSION AND SEDIMENT CONTROL MEASURES AND WORKS

The work and measures shall include but not be limited to the following, as shown on the drawings or as specified in Section 8 of this specification.

Staging of Earthwork Activities - The excavation and moving of soil materials shall be scheduled so that the smallest possible areas will be unprotected from erosion for the shortest time feasible.

Seeding - Seedings to protect disturbed areas shall be done as specified on the drawings or in Section 8 of this specification.

Mulching - Mulching shall be used to provide temporary protection to soil surfaces from erosion.

Diversions - Diversions shall be used to divert water away from work areas and/or to collect runoff from work areas for treatment and safe disposition.

Stream Crossings - Culverts or bridges shall be used where equipment must cross streams.

Sediment Basins - Sediment basins shall be used to settle and filter out sediment from eroding areas to protect properties and streams below the construction site.

Straw Bale Filters - Straw bale filters shall be used to trap sediment from areas of limited runoff. Bales are temporary and shall be removed when permanent measures are installed.

Waterways - Waterways shall be used for the safe disposal of runoff from fields, diversions and other structures or measures.

4. CHEMICAL POLLUTION

The Contractor shall provide watertight tanks or barrels or construct a sump sealed with plastic sheets to be used to dispose of chemical pollutants (such as drained lubricating or transmission oils, greases, soaps, asphalt, etc.) produced as a by-product of the project's work. At the completion of the construction work, sumps shall be voided without causing pollution as specified in Section 8 of this specification.

Sanitary facilities such as pit toilets, chemical toilets, or septic tanks shall not be placed adjacent to live streams, wells, or springs. They shall be located at a distance sufficient to prevent contamination of any water sources. At the completion of construction work, facilities shall be disposed of without causing pollution as specified in Section 8 of this specification

5. AIR POLLUTION

Local and state regulations concerning the burning of brush or slash or disposal of other materials shall be adhered to.

Fire prevention measures shall be taken to prevent the start or the spreading of fires which result from project work. Fire breaks or guards shall be constructed at locations shown on the drawings.

All public access or haul roads used by the contractor during construction of the project shall be sprinkled or otherwise treated to fully suppress dust.

6. MAINTENANCE, REMOVAL, AND RESTORATION

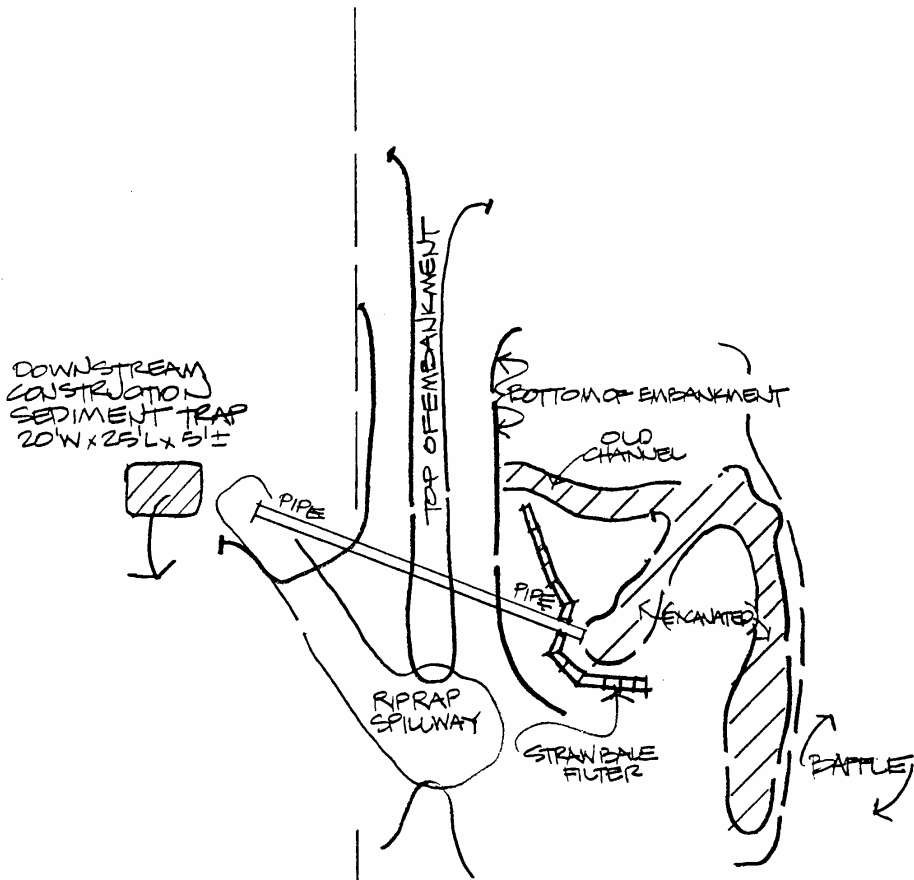
All pollution control measures and works shall be adequately maintained in a functional condition as long as needed during the construction operation. All temporary measures shall be removed and the site restored to as nearly original conditions as practicable.

7. MEASUREMENT AND PAYMENT

Method 1 For items of work for which specific unit prices are established in the contract each item will be measured to the nearest unit applicable. Payment for each item will be made at the contract unit price for that item. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 2 For items of work for which specific lump sum prices are established in the contract, payment for pollution control will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items, and the items to which they are made subsidiary, are identified in Section 8 of this specification.



1 2 POLLUTION CONTROL SCHEMATIC

1" = 50'

1. CONSTRUCT DOWNSTREAM SEDIMENT TRAP FIRST.
2. DURING & AFTER OUTLET PIPE CONSTRUCTION, MAINTAIN STRAW BALE FILTER.
3. CLEANOUT OLD CHANNEL & EXCAVATION SHOWN (AS THESE ACT AS CONSTRUCTION SEDIMENT TRAPS) AS DIRECTED BY ENGINEER.
4. SEE CONSTRUCTION SPECIFICATION 5.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction detail therefore are:

a. Bid item 2 Pollution Control,

- (1) This item shall consist of application of erosion and sediment control measures where indicated on the plans and as per Section 3:
 - a. Seeding
 - b. Mulching
 - c. Sediment basins
 - d. Straw bale filters
- (2) Sediment shall be removed from traps and filters indicated on the Pollution Control Schematic as needed or at the request of the Owner. Material removed from the traps shall be disposed of by spreading in adjacent areas.
- (3) In Section 7, Measurement and Payment, Method 2 shall apply.
- (4) Payment for this item shall include compensation for the mobilization, materials, and soil spreading.

CONSTRUCTION SPECIFICATION

10. WATER FOR CONSTRUCTION

1. SCOPE

The work shall consist of furnishing, transporting, and using water for construction purposes in accord with the applicable specifications.

2. FACILITIES AND EQUIPMENT

The Contractor shall build and maintain such access and haul roads as are needed, and shall furnish, operate, and maintain all pumps, piping, tanks, and other facilities needed to load, transport, and use the water as specified.

These facilities shall be equipped with meters, tanks, or other devices by which the volume of water supplied can be measured.

3. DUST ABATEMENT AND HAUL ROAD MAINTENANCE

Water for dust abatement and haul road maintenance shall be applied to haul roads and other dust-producing areas as needed to prevent excessive dust and to maintain the roads in good condition for efficient operation while they are in use.

4. EARTHFILL, DRAINFILL, ROCKFILL

Water for earthfill, drainfill, or rockfill shall be used in the fill materials as specified in the applicable construction specifications.

5. CONCRETE, MORTAR, GROUT

Water used in mixing or curing concrete, pneumatically applied mortar, or other portland cement mortar or grout shall meet the requirements of the applicable construction specifications and shall be used in conformance with those specifications. Payment for water used in these items is covered by the applicable concrete, mortar, or grout specification.

6. MEASUREMENT AND PAYMENT

For water items for which specific unit prices are established in the contract, the volume of water furnished and used in accordance with the specifications will be measured to the nearest 1000 gallons.

Except as otherwise specified, the measurement for payment will include all water needed at the construction site, except as noted in Section 5, to perform the work required under the contract in accordance with the specifications but will not include water wasted or used in excess of the amount needed. It will not include water used in concrete which is mixed elsewhere and transported to the site.

Payment for water will be made at the contract unit price. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to furnishing, transporting, and using the water.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefor are:

a. Subsidiary Item, Water For Construction

- (1) This item consists of furnishing all water called for in these specifications.
- (2) No separate payment shall be made for "Water For Construction." Compensation for the Water shall be included in the payment for that item in which it is used.

CONSTRUCTION SPECIFICATION

11. REMOVAL OF WATER

1. SCOPE

The work shall consist of the removal of surface water and ground water as needed to perform the required construction in accordance with the specifications. It shall include (1) building and maintaining all necessary temporary impounding works, channels, and diversions, (2) furnishing, installing and operating all necessary pumps, piping and other facilities and equipment, and (3) removing all such temporary works and equipment after they have served their purposes.

2. DIVERTING SURFACE WATER

The Contractor shall build, maintain and operate all cofferdams, channels, flumes, sumps, and other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site and away from the construction work while construction is in progress. Unless otherwise specified, a diversion must discharge into the same natural drainage in which its headworks are located.

Unless otherwise specified, the Contractor shall furnish to the Engineer in writing, his plan for diverting surface water before beginning the construction work for which the diversion is required. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

3. DEWATERING THE CONSTRUCTION SITE

Foundations, cutoff trenches and other parts of the construction site shall be dewatered and kept free of standing water or excessively muddy conditions as needed for proper execution of the construction work. The Contractor shall furnish, install, operate and maintain all drains, sumps, pumps, casings, wellpoints, and other equipment needed to perform the dewatering as specified. Dewatering methods that cause a loss of fines from foundation areas will not be permitted.

Unless otherwise specified, the Contractor shall furnish to the Contracting Officer, in writing, his plan for dewatering before beginning the construction work for which the dewatering is required. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

4. DEWATERING BORROW AREAS

Unless otherwise specified in Section 8, the Contractor shall maintain the borrow areas in drainable condition or otherwise provide for timely and effective removal of surface and ground waters that accumulate within the borrow areas from any source. Borrow material shall be processed as necessary to achieve proper and uniform moisture content for placement.

If pumping to dewater borrow areas is included as an item of work in the bid schedule, each pump used for this purpose shall be equipped with a water meter in the discharge line. Accuracy of the meters shall be such that the measured quantity of water is within 3 percent, plus or minus, of the true quantity. Means shall be provided by the Contractor to check the accuracy of the water meters when requested by the Engineer.

5. EROSION AND POLLUTION CONTROL

Removal of water from the construction site, including the borrow areas shall be accomplished in such a manner that erosion and the transmission of sediment and other pollutants are minimized.

6. REMOVAL OF TEMPORARY WORKS

After the temporary works have served their purposes, the Contractor shall remove them or level and grade them to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

Except as otherwise specified, pipes and casings shall be removed from temporary wells and the wells shall be filled to ground level with gravel or other suitable material approved by the Engineer.

7. MEASUREMENT AND PAYMENT

Method 1 Items of work listed in the bid schedule for removal of water, diverting surface water, dewatering construction sites, and dewatering borrow areas will be paid for at the contract lump sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 2 Items of work listed in the bid schedule for removal of water, diverting surface water, dewatering construction sites, and dewatering borrow areas will be paid for at the contract lump sum prices. Such payment will constitute full compensation for furnishing, installing, operating, and maintaining the necessary trenches, drains, sumps, pumps, and piping, and for all labor,

equipment, tools, and all other items necessary and incidental to the completion of the work, except that additional payment for pumping to dewater borrow areas will be made as described in the following paragraph.

If pumping to dewater borrow areas is listed as an item of work in the bid schedule, payment will be made at the contract unit price which shall be the price per 1,000 gallons shown in the bid schedule. Such payment will constitute full compensation for pumping only. Compensation for equipment and preparation and for other costs associated with pumping will be included in the lump sum payment for removal of water or the lump sum payment for dewatering borrow areas. Payment will be made only for pumping that is necessary to dewater borrow areas that cannot be effectively drained by gravity or that must have the water table lowered to be usable. Pumping for other purposes will not be included for payment in this item.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 8 of this specification.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefor are:

a. Subsidiary Item, Removal of Water

- (1) This item shall consist of all work necessary to divert the streamflow and other surface water and dewatering of the worksite.
- (2) No separate payment shall be made for diverting the streamflow and dewatering the worksite.

CONSTRUCTION SPECIFICATION

21. EXCAVATION

1. SCOPE

The work shall consist of the excavation required by the drawings and specifications and disposal of the excavated materials.

2. CLASSIFICATION

Excavation will be classified as common excavation or rock excavation in accordance with the following definitions or will be designated as unclassified.

Common excavation shall be defined as the excavation of all materials that can be excavated, transported, and unloaded by the use of heavy ripping equipment and wheel tractor-scrappers with pusher tractors or that can be excavated and dumped into place or loaded onto hauling equipment by means of excavators having a rated capacity of one cubic yard and equipped with attachments (such as shovel, bucket, backhoe, dragline or clam shell) appropriate to the character of the materials and the site conditions.

Rock excavation shall be defined as the excavation of all hard, compacted or cemented materials the accomplishment of which requires blasting or the use of excavators larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than one cubic yard in volume encountered in materials otherwise conforming to the definition of common excavation shall be classified as rock excavation.

Excavation will be classified according to the above definitions by the Engineer, based on his judgment of the character of the materials and the site conditions.

The presence of isolated boulders or rock fragments larger than one cubic yard in size will not in itself be sufficient cause to change the classification of the surrounding material.

For the purpose of this classification, the following definitions shall apply:

Heavy ripping equipment shall be defined as a rear-mounted, heavy duty, single-tooth, ripping attachment mounted on a tractor having a power rating of 200-300 net horsepower (at the flywheel).

Wheel tractor-scraper shall be defined as a self-loading (not elevating) and unloading scraper having a struck bowl capacity of 12-20 yards.

Pusher tractor shall be defined as a track type tractor having a power rating of 200-300 net horsepower (at the flywheel) equipped with appropriate attachments.

3. UNCLASSIFIED EXCAVATION

Items designated as "Unclassified Excavation" shall include all materials encountered regardless of their nature or the manner in which they are removed. When excavation is unclassified, none of the definitions or classifications stated in Section 2 of this specification shall apply.

4. BLASTING

The transportation, handling, storage, and use of dynamite and other explosives shall be directed and supervised by a person of proven experience and ability in blasting operations.

Blasting shall be done in such a way as to prevent damage to the work or unnecessary fracturing of the foundation and shall conform to any special requirements in Section 12 of this specification.

5. USE OF EXCAVATED MATERIALS

Method 1 To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent earthfill or rockfill. The suitability of materials for specific purposes will be determined by the Engineer. The Contractor shall not waste or otherwise dispose of suitable excavated materials.

Method 2 Suitable materials from the specified excavations may be used in the construction of required earthfill or rockfill. The suitability of materials for specific purposes will be determined by the Engineer.

6. DISPOSAL OF WASTE MATERIALS

Method 1 All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of at the discretion of the Engineer.

Method 2 All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of by the Contractor at sites of his own choosing away from the site of the work.

7. BRACING AND SHORING

Excavated surfaces too steep to be safe and stable if unsupported shall be supported as necessary to safeguard the work and workmen, to prevent sliding or settling of the adjacent ground, and to avoid damaging existing improvements. The width of the excavation shall be increased if necessary to provide space for sheeting, bracing, shoring, and other supporting installations. The Contractor shall furnish, place and subsequently remove such supporting installations.

8. STRUCTURE AND TRENCH EXCAVATION

Structure or trench excavation shall be completed to the specified elevations and to sufficient length and width to include allowance for forms, bracing and supports, as necessary, before any concrete or earthfill is placed or any piles are driven within the limits of the excavation.

9. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified excavations are insufficient to construct the specified fills, additional materials shall be obtained from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas shall be as directed by the Engineer.

Borrow pits shall be excavated and finally dressed in a manner to eliminate steep or unstable side slopes or other hazardous or unsightly conditions.

10. OVEREXCAVATION

Excavation in rock beyond the specified lines and grades shall be corrected by filling the resulting voids with portland cement concrete made of materials and mix proportions approved by the Engineer. Concrete that will be exposed to the atmosphere when construction is completed shall contain not less than 6 sacks of cement per cubic yard of concrete. Concrete that will be permanently covered shall contain not less than 4-1/2 sacks of cement per cubic yard. The concrete shall be placed and cured as specified by the Engineer.

Excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with approved compacted earthfill, except that, if the earth is to become the subgrade for riprap, rockfill, sand or gravel bedding, or drainfill, the voids may be filled with material conforming to the specifications for the riprap, rockfill, bedding or drainfill.

11. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Regardless of quantities excavated, the measurement for payment will be made to the specified pay limits, except that excavation outside the specified lines and grades directed by the Engineer to remove unsuitable material will be included. Excavation required because unsuitable conditions result from the Contractor's improper construction operations, as determined by the Contracting Officer will not be included for measurement and payment.

Method 1 The pay limits shall be as designated on the drawings.

Method 2 The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be the modified ground surface resulting from the specified previous excavation or fill.
- b. The lower and lateral limits shall be the neat lines and grades shown on the drawings.

Method 3 The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be the modified ground surface resulting from the specified previous excavation or fill.
- b. The lower and lateral limits shall be the true surface of the completed excavation as directed by the Engineer.

Method 4 The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed prior to the start of construction operations except that where excavation is performed within areas designated for previous excavation or fill the upper limit shall be the modified ground surface resulting from the specified previous excavation or fill.

- b. The lower limit shall be at the bottom surface of the proposed structure.
- c. The lateral limits shall be 18 inches outside of the outside surfaces of the proposed structure or shall be vertical planes 18 inches outside of and parallel to the footings, whichever gives the larger pay quantity, except as provided in d, below.
- d. For trapezoidal channel linings or similar structures that are to be supported upon the sides of the excavation without intervening forms, the lateral limits shall be at the under side of the proposed lining or structure.
- e. For the purposes of the definitions in b, c, and d, above, any specified bedding or drainfill directly beneath or beside the structure will be considered to be a part of the structure.

All Methods The following provisions apply to all methods of measurement and payment.

Payment for each type and class of excavation will be made at the contract unit price for that type and class of excavation. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the performance of the work, except that extra payment for backfilling overexcavation will be made in accordance with the following provisions:

Payment for backfilling overexcavation, as specified in Section 10 of this specification, will be made only if the excavation outside specified lines and grades is directed by the Engineer to remove unsuitable material and if the unsuitable condition is not a result of the Contractor's improper construction operations as determined by the Contracting Officer.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 12 of this specification.

12. ITEMS OF WORK AND CONSTRUCTED DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

- a. In Section 5, Use of Excavated Materials, Method 1, shall apply.
- b. In Section 6, Disposal of Waste Materials, Method 1, shall apply, (at the discretion of the Engineer).
- c. Bid Item 8, Common Site Excavation.
 - (1) This item consists of excavation required during construction as shown on the plans to obtain grades on primarily the southeast sector of the project.
- d. Bid Item 9, Common Excavation. (sediment traps, islands)
 - (1) This item of work includes excavation of sediment traps, excavation adjacent to islands, and grading of sediment traps and islands to elevations shown on the drawings.
 - (2) Stripping salvaging and spreading of topsoil from the foundation of sediment traps and islands, Specification 26, is subsidiary to this item.
- e. Bid Item 10, Common Excavation (baffles)
 - (1) This item of work includes excavation adjacent to baffles and grading of baffles to elevations shown on the drawings.
 - (2) Stripping, salvaging and spreading of topsoil from the foundation of the baffles, Specification 26, is subsidiary to this item.
- f. Subsidiary to Bid Item 11, Earthfill, Class B (embankment)
 - (1) This item of work includes excavation of core trench for embankment to lines and grades as shown on drawings.
 - (2) Care shall be taken not to excavate below the grades shown and into underlying sand layers.
 - (3) Compensation is included under Bid Item 11.

- g. Subsidiary to Bid Item 11, Earthfill, Class B (embankment)
 - (1) This item of work includes all borrow excavation in areas as shown on drawing necessary for the construction of the embankment with suitable materials.
 - (2) Compensation is included under Bid Item 11.
- h. Subsidiary to Bid Item 11, Earthfill, Class B (embankment)
 - (1) This item of work includes all excavation necessary for construction of the overflow spillway of the embankment to the lines and grades shown on the drawings.
 - (2) Compensation is included under Bid Item 11.
- i. Bid Item 5, Channel Piping, is included under Specification 51, and requires coordination with Bid Item 10.
- j. In Section 11, Measurement and Payment, Method 2, shall apply.
- k. Compensation for these items includes all mobilization, access through to the site, and restoration thereof.

CONSTRUCTION SPECIFICATION

23. EARTHFILL

1. SCOPE

The work shall consist of the construction of earth embankments and other earthfills required by the drawings and specifications.

2. MATERIALS

All fill materials shall be obtained from required excavations and designated borrow areas. The selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the Engineer.

Fill materials shall contain no sod, brush, roots or other perishable materials. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.

The types of materials used in the various fills shall be as listed and described in the specifications and drawings.

3. FOUNDATION PREPARATION

Foundations for earthfill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earthfill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the earthfill can be compacted against them to effect a good bond between the fill and the abutments.

Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be free of standing water when fill is placed upon them. Occasional rock

outcrops in earth foundations for earthfill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

Foundation and abutment surfaces shall be not steeper than 1 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earthfill conforming to the specifications for the earthfill to be placed upon the foundation.

4. PLACEMENT

Fill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the Engineer. Fill shall not be placed upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

Fill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed the maximum thickness specified. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of fill compacted by manually directed power tampers.

Adjacent to structures, fill shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Earthfill in dams, levees and other structures designed to restrain the movement of water shall be placed so as to meet the following additional requirements:

- a. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material.
- b. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.

- c. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of approximately 2 percent shall be maintained to insure effective drainage, and except as otherwise specified for drainfill or sectional zones.
- d. Dam embankments shall be constructed in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of stream flow during construction are specifically authorized in the contract.
- e. Embankments built at different levels as described under (c) or (d) above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all material not meeting the requirements of this specification, and shall be scarified, moistened and recompacted when the new fill is placed against it as needed to insure a good bond with the new fill and to obtain the specified moisture content and density at the contact of the in place and new fills.

5. CONTROL OF MOISTURE CONTENT

During placement and compaction of fill, the moisture content of the materials being placed shall be maintained within the specified range.

The application of water to the fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary. Uniform moisture distribution shall be obtained by diskings.

Material that is too wet when deposited on the fill shall either be removed or be dried to the specified moisture content prior to compaction.

If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall either be removed or scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

6. COMPACTION

Earthfill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction. Each layer of fill shall be compacted as necessary to make the density of the fill matrix not less than the minimum density specified. The fill matrix is defined as the portion of the fill material finer than the maximum particle size used in the compaction test method specified.

Class B compaction. Each layer of fill shall be compacted to a mass density not less than the minimum density specified.

Class C compaction. Each layer of fill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified, or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping or manually directed power tampers or plate vibrators. Unless otherwise specified, heavy equipment including backhoe mounted powertampers, or vibrating compactors and manually directed vibrating rollers, shall not be operated within 2 feet of any structure. Towed or self-propelled vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

The passage of heavy equipment will not be allowed: (1) over cast-in-place conduits prior to 14 days after placement of the concrete; (2) over cradled or bedded precast conduits prior to 7 days after placement of the concrete cradle or bedding; or (3) over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 2 feet, whichever is greater.

Compacting of fill adjacent to structures shall not be started until the concrete has been allowed to cure for seven days.

When the required strength of the concrete is not specified as described above, compaction of fill adjacent to structures shall not be started until the following time intervals have elapsed after placement of the concrete.

<u>Structure</u>	<u>Time Interval</u>
Retaining walls and counterforts (impact basins)	14 days
Walls backfilled on both sides simultaneously	7 days
Conduits and spillway risers, cast- in-place (with inside forms in place)	7 days
Conduits and spillway risers, cast-in- place (inside forms removed)	14 days
Conduits, precast, cradled	2 days
Conduits, precast, bedded	1 day
Cantilever outlet bents (backfilled) both sides simultaneously)	3 days

7. REWORKING OR REMOVAL AND REPLACEMENT OF DEFECTIVE FILL

Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced by acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control and compaction.

8. TESTING

(See SR 1 item 8.)

During the course of the work, the Engineer will perform such tests as are required to identify materials, to determine compaction characteristics, to determine moisture content, and to determine density of fill in place. These tests performed by the Engineer will be used to verify that the fills conform to the requirements of the specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

Densities of fill requiring Class A compaction will be determined by the Engineer in accordance with ASTM Method D 1556, D 2167, D 2922 or D 2937 except that the volume and moist weight of included rock particles larger than those used in the compaction test method specified for the type of fill will be determined and deducted from the volume and moist weight of the total sample prior to computation of density or if using the nuclear gauge, added to the specified density to bring it to the measure of equivalent composition for comparison. The density so computed will be used to determine the percent compaction of the fill matrix. Unless otherwise specified, moisture content will be determined by one of the following methods: ASTM Method D 2216 or D 3017.

9. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type and compaction class of earthfill within the specified zone boundaries and pay limits will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified, no deduction in volume will be made for embedded conduits and appurtenances.

The pay limits shall be as defined below, with the further provision that earthfill required to fill voids resulting from overexcavation of the foundation, outside the specified lines and grades, will be included in the measurement for payment only where such overexcavation is directed by the Engineer to remove unsuitable material and where the unsuitable condition is not a result of the Contractor's improper construction operations as determined by the Engineer.

Method 1 The pay limits shall be as designated on the drawings.

Method 2 The pay limits shall be the measured surface of the foundation when approved for placement of the fill and the specified neat lines of the fill surface.

Method 3 The pay limits shall be the measured surface of the foundation when approved for placement of the fill and the measured surface of the completed fill.

Method 4 The pay limits shall be the specified pay limits for excavation and the specified neat lines of the fill surface.

Method 5 The pay limits shall be the specified pay limits for excavation and the measured surface of the completed fill.

Method 6 Payment for each type and compaction class of earthfill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work.

Method 7 Payment for each type and compaction class of earthfill will be made at the contract unit price for that type and compaction class of fill. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work, except furnishing, transporting, and applying water to the foundation and fill materials. Water applied to the foundation and fill materials will be measured and payment will be made as specified in Construction Specification 10.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 10 of this specification.

10. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Bid Item 11, Earthfill, Class B, (Embankment)

- (1) This item shall consist of the placement of the fill in the embankment and core trench.
- (2) Fill shall be placed according to plans, sections, and details.
- (3) Material for the embankment earthfill shall come from borrow excavation shown on the plans.
- (4) Earthfill shall be :
 - (a) Compaction Class B. The fill matrix shall be compacted to a density indicated on the drawings.
 - (b) The maximum thickness of each layer placed before compaction shall be nine (9) inches.
- (5) In Section 9, Measurement and Payment, Methods 4 & 6 shall apply as per the Plan Quantity shown in the Bid Schedule.
- (6) Stripping, salvaging and spreading of topsoil, Specification 26, from the foundation of the embankment is subsidiary to this item.
- (7) Excavation of the borrow area to obtain suitable fill and the core trench and the foundation of the overflow spillway for the embankment, Specification 21, is subsidiary to this item.
- (8) Compensation for this item includes all work necessary for the construction of the embankment and shaping of the foundation of the overflow spillway including dewatering if necessary.

CONSTRUCTION SPECIFICATION

26. SALVAGING AND SPREADING TOPSOIL

1. SCOPE

The work shall consist of salvaging topsoil from borrow pits or required excavations and spreading it on the areas shown on the drawings to the specified depths.

2. QUALITY OF TOPSOIL

Topsoil shall consist of friable surface soil reasonably free of grass, roots, weeds, sticks, stones or other foreign materials.

3. EXCAVATION

After the site has been cleared and grubbed the topsoil shall be removed from the designated areas and shall be stockpiled at locations shown on the drawings or approved by the Engineer. Objectionable materials encountered during excavation shall be removed and buried at locations shown on the drawings or approved by the Engineer or otherwise removed from the construction site.

4. SPREADING

Method 1 Spreading shall not be done when the ground or topsoil is frozen, excessively wet or otherwise in a condition detrimental to the work. Surfaces designated to be covered shall be lightly scarified just prior to the spreading operation.

After placement is completed the surface of the topsoil shall be finished to a reasonably smooth surface.

Method 2 Spreading shall not be done when the ground or topsoil is frozen, excessively wet or otherwise in a condition detrimental to the work. Surfaces designated to be covered shall be lightly scarified just prior to the spreading operation. Where compacted fills are designated to be covered by topsoil, the topsoil shall be placed concurrently with the fill and shall be bonded to the compacted fill with the compacting equipment.

After placement is completed the surface of the topsoil shall be finished to a reasonably smooth surface.

5. MEASUREMENT AND PAYMENT

Method 1 The total areas of the surfaces covered by topsoil will be computed to the nearest square yard. Payment for salvaging and placing topsoil will be made at the contract unit price. Such

payment will constitute full compensation for all materials, labor and equipment and all other items necessary and incidental to the completion of the work, including excavating, stockpiling, hauling, and spreading.

Method 2 The total area of the surfaces covered by topsoil will be computed to the nearest square yard except that the areas of the surfaces of embankments, levees, dikes and other earthfills will not be included for payment. Payment for salvaging and placing topsoil will be made at the contract unit price. Such payment will constitute full payment for all materials, labor and equipment and all other items necessary and incidental to the completion of the work, including excavating, stockpiling, hauling, and spreading.

Payment for topsoil spread on the surfaces of embankments, levees, dikes and other earthfills will be considered as included in the payment for the item of earthfill under which the embankment, levee, dike, or other earthfill is constructed.

Method 3 For items of work for which specific unit prices are established in the contract, the volume of topsoil salvaged and spread will be measured by cross section surveys of the stockpile from which it is taken if it is stockpiled, otherwise, of the area from which it is borrowed; and will be computed to the nearest cubic yard by the method of average cross-sectional end areas. Payment for salvaging and spreading topsoil will be made at the contract unit price. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the performance of the work including excavation, stockpiling, hauling, and spreading.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 6 of this specification.

6. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Bid item 7 Topsoil Stripping and Replacement

- (1) This item consists of stripping organic topsoil from borrow areas indicated, placement at perimeter of borrow as per details, and spreading remaining topsoil over borrow and stockpile area to grades shown on the drawings.
- (2) Excess topsoil may be placed on adjacent baffles and islands or the embankment to grades shown on the drawings.
- (3) In section 4, Spreading, Method 1, shall apply.
- (4) In section 5, Measurement and Payment, is made by Plan Quantities indicated on the Bid Form.
- (5) Compensation under this item includes all mobilization, dewatering (if necessary), stockpiling, spreading to grade or at the direction of the Engineer.

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b. Subsidiary to Bid Items 9 and 10, Excavation

- (1) This item includes the stripping and salvaging of topsoil from the foundations of the baffles, islands and sediment traps and spreading on same.
- (2) Compensation is included under Bid Items 9, and 10.

c. Subsidiary to Bid Item 11, Earthfill

- (1) This item includes the stripping and salvaging of topsoil from the foundation of the embankment and spreading on same.
- (2) Compensation is included under Bid Item 11.

CONSTRUCTION SPECIFICATION

32. CONCRETE FOR MINOR STRUCTURES

1. SCOPE

The work shall consist of furnishing, forming, placing, finishing and curing portland cement concrete as required to build the structures named in Section 24 of this specification.

2. MATERIALS

Portland cement shall conform to the requirements of Material Specification 531 for the specified type.

Aggregates shall conform to the requirements of Material Specification 522 unless otherwise specified. The grading of coarse aggregates shall be as specified in Section 24.

Water shall be clean and free from injurious amounts of oil, salt, acid, alkali, organic matter or other deleterious substances.

Preformed expansion joint filler shall conform to the requirements of Material Specification 535.

Waterstops shall conform to the requirements of Material Specifications 537 and 538 for the specified kinds.

3. CLASS OF CONCRETE

Concrete for minor structures shall be classified as follows:

<u>Class of Concrete</u>	<u>Maximum Net Water Content (gallons/bag)</u>	<u>Minimum Cement Content (bags/cu. yd.)</u>
3000M	7	6
4000M	6	6

4. AIR CONTENT AND CONSISTENCY

Unless otherwise specified, the slump shall be 2 to 4 inches. If air entrainment is specified, the air content by volume shall be 5 to 8 percent of the volume of the concrete. When specified, directed or approved by the Engineer, a water-reducing, set-retarding or other admixture shall be used.

5. DESIGN OF THE CONCRETE MIX

The proportions of the aggregates shall be such as to produce a concrete mixture that will work readily into the corners and angles

of the forms and around reinforcement when consolidated, but will not segregate or exude free water during consolidation.

Prior to placement of concrete, the Contractor shall furnish the Contractor Officer for approval, a statement of the materials and mix proportions (including admixtures, if any) he intends to use. The statement shall include evidence satisfactory to the Contracting Officer that the materials and proportions will produce concrete conforming to this specification. The materials and proportions so stated shall constitute the "job mix." After a job mix has been approved, neither the source, character or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the Contracting Officer. If such changes are necessary, no concrete containing such new or altered materials shall be placed until the Contracting Officer has approved a revised job mix.

6. INSPECTION AND TESTING

The Engineer shall have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the Engineer to inspect materials, equipment and processes and to obtain samples of the concrete. All tests and inspections will be conducted so as not to interfere unnecessarily with manufacture and delivery of the concrete.

7. HANDLING AND MEASUREMENT OF MATERIALS

Materials shall be stockpiled and batched by methods that will prevent segregation or contamination of aggregates and insure accurate proportioning of the ingredients of the mix.

Except as otherwise provided in Section 8, cement and aggregates shall be measured as follows:

Cement shall be measured by weight or in bags of 94 pounds each. When cement is measured in bags, no fraction of a bag shall be used unless weighed.

Aggregates shall be measured by weight. Mix proportions shall be based on saturated, surface-dry weights. The batch weight of each aggregate shall be the required saturated, surface-dry weight plus the weight of surface moisture it contains.

Water shall be measured, by volume or by weight, to an accuracy within one percent of the total quantity of water required for the batch.

Admixtures shall be measured within a limit of accuracy of three percent.

8. MIXERS AND MIXING

Concrete shall be uniform and thoroughly mixed when delivered to the work. Variations in slump of more than 1 inch within a batch will be considered evidence of inadequate mixing and shall be corrected by increasing mixing time or other means.

For stationary mixers, the mixing time after all cement and aggregates are in the mixer drum shall be not less than 1-1/2 minutes. When concrete is mixed in a truck mixer, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100.

Unless otherwise specified, volumetric batching and continuous mixing at the construction site will be permitted. The batching and mixing equipment shall conform to the requirements of ASTM Specification C 685 and shall be demonstrated prior to placement of concrete, by tests with the job mix, to produce concrete meeting the specified proportioning and uniformity requirements. Concrete made by this method shall be produced, inspected, and certified in conformance with Sections 6, 7, 8, 13, and 14 of ASTM Specification C 685.

No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.

9. FORMS

Forms shall be of wood, plywood, steel or other approved material and shall be mortar tight. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with a nonstaining form release agent before being set into place.

Metal ties or anchorages within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least one inch without injury to the concrete. Ties designed to break off below the surface of the concrete shall not be used without cones.

All edges that will be exposed to view when the structure is completed shall be chamfered, unless finished with molding tools as specified in Section 18.

10. PREPARATION OF FORMS AND SUBGRADE

Prior to placement of concrete the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar,

or other harmful substances or coatings and the temperature of all surfaces to be in contact with the new concrete shall be no colder than 40°F. Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. Rock surfaces shall be cleaned by air-water cutting, wet sandblasting or wire brush scrubbing, as necessary, and shall be wetted immediately prior to placement of concrete. Earth surfaces shall be firm and damp. Placement of concrete on mud, dried earth or uncompacted fill or frozen subgrade will not be permitted.

Items to be embedded in the concrete shall be positioned accurately and anchored firmly.

Weepholes in walls or slabs shall be formed with nonferrous materials.

11. CONVEYING

Concrete shall be delivered to the site and discharged into the forms within 1-1/2 hours after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes.

The Engineer may allow a longer time, provided the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. In any case, concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods that will prevent segregation of the aggregates or loss of mortar.

12. PLACING

Concrete shall not be placed until the subgrade, forms and steel reinforcement have been inspected and approved. No concrete shall be placed except in the presence of the Engineer. The Contractor shall give reasonable notice to the Engineer each time he intends to place concrete. Such notice shall be far enough in advance to give the Engineer adequate time to inspect the subgrade, forms, steel reinforcement and other preparations for compliance with the specifications. "Other preparations" includes but is not limited to the concrete mixing plant, delivery equipment system, placing and finishing equipment and system, schedule of work, workforce, heating or cooling facilities if applicable. Deficiencies are to be corrected before concrete is delivered for placing.

The concrete shall be deposited as closely as possible to its final position in the forms and shall be worked into the corners and angles of the forms and around all reinforcement and embedded items

in a manner to prevent segregation of aggregates or excessive laitance. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Concrete shall not be dropped more than five feet vertically unless suitable equipment is used to prevent segregation. Hoppers and chutes, pipes or "elephant trunks" shall be used as necessary to prevent segregation and the splashing of mortar on the forms and reinforcing steel above the layer of being placed.

Immediately after the concrete is placed in the forms, it shall be consolidated by spading, hand tamping or vibration as necessary to insure smooth surfaces and dense concrete. Each layer shall be consolidated to insure monolithic bond with the preceding layer. If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when spaded or vibrated, the Contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified in Section 13.

If placing is discontinued when an incomplete horizontal layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

13. CONSTRUCTION JOINTS

Construction joints shall be made at the locations shown on the drawings. If construction joints are needed which are not shown on the drawings, they shall be placed in locations approved by the Engineer.

Where a feather edge would be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used so that the resulting edge thickness on either side of the joint is not less than 6 inches.

In walls and columns, as each lift is completed, the top surfaces shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

Surfaces of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings or debris by washing and scrubbing with a wire brush or wire broom or by other means approved by the Engineer. The surfaces shall be kept moist for at least one hour prior to placement of the new concrete.

14. EXPANSION AND CONTRACTION JOINTS

Expansion and contraction joints shall be made only at locations shown on the drawings.

Exposed concrete edges at expansion and contraction joints shall be carefully tooled or chamfered, and the joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

Preformed expansion joint filler shall be held firmly in the correct position as the concrete is placed.

When open joints are specified, they shall be constructed by the insertion and subsequent removal of a wooden strip, metal plate or other suitable template in such a manner that the corners of the concrete will not be chipped or broken. The edges of open joints shall be finished with an edging tool prior to removal of the joint strips.

15. WATERSTOPS

Waterstops shall be held firmly in the correct position as the concrete is placed. Joints in metal waterstops shall be soldered, brazed or welded. Joints in rubber or plastic waterstops shall be cemented, welded or vulcanized as recommended by the manufacturer.

16. REMOVAL OF FORMS

Forms shall not be removed without the approval of the Engineer. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually.

17. FINISHING FORMED SURFACES

Immediately after the removal of the forms:

- a. All fins and irregular projections shall be removed from exposed surfaces.
- b. The holes produced on all surfaces by the removal of form ties, cone-bolts, and she-bolts shall be cleaned, wetted and filled with a dry-pack mortar consisting of one part portland cement, three parts sand that will pass a No. 16 sieve, and just sufficient water to produce a consistency such that the filling is at the point of becoming rubbery when the material is solidly packed.

18. FINISHING UNFORMED SURFACES

All exposed surfaces of the concrete shall be accurately screeded to grade and then float finished, unless specified otherwise.

Excessive floating or troweling of surfaces while the concrete is soft will not be permitted.

The addition of dry cement or water to the surface of the screeded concrete to expedite finishing will not be allowed.

Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

19. CURING

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period, or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding or fog spraying or by covering with continuously moistened canvas, cloth mats, straw, sand or other approved material. Wood forms left in place during the curing period shall be kept continuously wet. Formed surfaces shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

Concrete, except at construction joints, may be coated with the approved curing compound in lieu of continued application of moisture, except as otherwise specified in Section 24. The compound shall be sprayed on the moist concrete surfaces as soon as free water has disappeared, but shall not be applied to any surface until patching, repairs and finishing of that surface are completed. The compound shall be applied at a uniform rate of not less than one gallon per 150 square feet of surface and shall form a continuous adherent membrane over the entire surface. Curing compound shall be thoroughly mixed before applying and continuously agitated during application. Curing compound shall not be applied to surfaces requiring bond to subsequently placed concrete, such as construction joints, shear plates, reinforcing steel and other embedded items. If the membrane is damaged during the curing period, the damaged area shall be resprayed at the rate of application specified above. Surfaces covered by the membrane shall not be trafficked unless protected from wear.

20. REMOVAL AND REPLACEMENT OR REPAIR

When concrete is honeycombed, damaged or otherwise defective, the Contractor shall remove and replace the structure or structural

member containing the defective concrete or, where feasible, correct or repair the defective parts. The Engineer will determine the required extent of removal, replacement or repair. Prior to starting repair work the Contractor shall obtain the Engineer's approval of his plan for effecting the repair. The Contractor shall perform all repair work in the presence of the Engineer.

21. CONCRETING IN COLD WEATHER

Concrete shall not be mixed nor placed when the daily minimum atmospheric temperature is less than 40°F unless facilities are provided to prevent the concrete from freezing. The use of accelerators or antifreeze compounds will not be allowed.

22. CONCRETING IN HOT WEATHER

The Contractor shall apply effective means to maintain the temperature of the concrete below 90°F during mixing, conveying and placing.

23. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, concrete will be measured to the neat lines shown on the drawings and the volume of concrete will be computed to the nearest 0.1 cubic yard. Measurement of concrete placed against the sides of an excavation without the use of intervening forms will be made only to the neat lines or pay limits shown on the drawings. No deduction in volume will be made for chamfers, rounded or beveled edges or for any void or embedded item that is less than 3 cubic feet in volume.

Payment for each item of concrete for minor structures will be made at the contract unit price or the contract lump sum, whichever is applicable, for that item. Such payment will constitute full compensation for all labor, materials, equipment, transportation, tools, forms, falsework, bracing and all other items necessary and incidental to the completion of the work, except items listed for payment elsewhere in the contract.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 24 of this specification.

24. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Subsidiary to Bid Item 4, Spillway Pipe System.

- (1) This item of work includes excavation and concrete class indicated on the plans and details required for construction of piers and riser base as shown on the plans, and dewatering (if necessary).
- (2) Compensation for this work is included under Bid Item 4.

CONSTRUCTION SPECIFICATION

51. CORRUGATED METAL PIPE CONDUITS

1. SCOPE

The work shall consist of furnishing and placing circular, arched or elliptical corrugated metal pipe and the necessary fittings.

2. MATERIALS

Pipe and fittings shall conform to the requirements of Material Specification 551 or Material Specification 552, whichever is specified.

3. LAYING AND BEDDING THE PIPE

Unless otherwise specified, the pipe shall be installed in accordance with the manufacturer's recommendations. The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps at the sides at about the vertical midheight of the pipe. Field welding of corrugated galvanized iron or steel pipe will not be permitted. Unless otherwise specified, the pipe sections shall be joined with standard coupling bands. The pipe shall be firmly and uniformly bedded throughout its entire length to the depth and in the manner specified on the drawings.

Perforated pipe shall be laid with the perforations down and oriented symmetrically about a vertical center line. Perforations shall be clear of any obstructions at the time the pipe is laid.

The pipe shall be loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

4. STRUTTING

When required, struts or horizontal ties shall be installed in the manner specified on the drawings. Struts and ties shall remain in place until the backfill has been placed to a height of 5 feet above the top of the pipe, or has been completed if the finished height is less than 5 feet above the top of the pipe, at which time they shall be removed by the Contractor.

5. HANDLING THE PIPE

The Contractor shall furnish such equipment as is necessary to place the pipe without damaging the pipe or coatings. The pipe shall be transported and handled in such a manner as to prevent bruising, scaling, or breaking of the spelter coating or bituminous coating.

6. REPAIR OF DAMAGED COATINGS

Any damage to the zinc coating shall be repaired by thoroughly wire brushing the damaged area, removing all loose and cracked coating, removing all dirt and greasy material with solvent, and painting with two (2) coats of one of the following paint options.

Painting shall be by use of one of the following options based upon installed exposure of the pipe as determined by the Contracting Officer:

Normal exterior or interior atmospheric exposure:

- (a) Zinc dust - zinc oxide primer, Federal Specification TT-P-641, Type I or Type II,
- (b) Single package, moisture cured urethane primer in silver metallic color, or
- (c) Zinc-rich cold galvanizing compound, brush, or aerosol application.

Submergence in water exposure:

- (a) Zinc dust-zinc oxide primer, Federal Specification TT-P-641, Type III.
- (b) Zinc dust paint, Military Specification MIL-P-21035,
- (c) Zinc Dust Chlorinated Rubber, Federal Specification TT-P-1046a, or
- (d) Epoxy-Polyamid, Department of Defense Specification DOD-P-15145 B.

If the coating is damaged in any individual area larger than 12 square inches, or if more than 0.2 percent of a total surface area of a length of pipe is damaged, the length will be rejected.

Breaks or scuffs in bituminous coatings that are less than 36 square inches in area shall be repaired by the application of two coats of hot asphaltic paint or a coating of cold-applied bituminous mastic. The repair coating shall be at least 0.05 inches thick after hardening and shall bond securely and permanently to the pipe. The material shall meet the physical requirements for bituminous coatings contained in the references cited in Material Specifications 551 and 552. Whenever individual breaks exceed 36 square inches in area or when the total area of breaks exceeds 0.5 percent of the total surface area of the pipe, the pipe will be rejected.

Bituminous coating damaged by welding of coated pipe or pipe fittings shall be repaired as specified in this Section for breaks and scuffs in bituminous coatings.

7. MEASUREMENT AND PAYMENT

Method 1 For items of work for which specific unit prices are established in the contract the quantity of each type, class, size and gauge of pipe will be determined to the nearest 0.1 foot by measurement of the laid length of pipe along the centerline of the pipe. Payment for each type, class, size and gauge of pipe will be made at the contract unit price for that type, class, size and gauge of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work.

Method 2 For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gauge of pipe will be determined as the sum of the nominal laying lengths of the pipe sections and fittings used. Payment for each type, class, size and gauge of pipe will be made at the contract unit price for that type, class, size and gauge of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work.

Method 3 For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gauge of pipe will be determined to the nearest 0.1 foot by measurement of the laid length of pipe along the centerline of the pipe. Payment for each type, class, size and gauge of pipe will be made at the contract unit price for that type, class, size and gauge of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work except items designated as "special fittings." Payment for special fittings will be made at the contract lump sum price for special fittings (CMP).

Method 4 For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gauge of pipe will be determined as the sum of the nominal laying lengths of the pipe sections and fittings used. Payment for each type, class, size and gauge of pipe will be made at the contract unit price for that type, class, size and gauge of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe and fittings and all other items necessary and incidental to the completion of the work except items designated as "special fittings." Payment for special fittings will be made at the contract lump sum price for special fittings (CMP).

Method 5 For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gauge of pipe will be determined to the nearest 0.1 foot by measurement of the laid length of pipe along the centerline of the pipe. Payment for each type, class, size and gauge of pipe will be made at the contract unit price for that type, class, size and gauge of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe, including the necessary fittings and all other items necessary and incidental to the completion of the work except the special fittings and appurtenances listed separately in the bid schedule. Payment for each special fitting and appurtenance will be made at the contract unit price for that type and size of fitting or appurtenance.

Method 6 For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size and gauge of pipe will be determined as the sum of the nominal laying lengths of the pipe sections used. Payment for each type, class, size and gauge of pipe will be made at the contract price for that type, class, size and gauge of pipe. Such payment will constitute full compensation for furnishing, transporting and installing the pipe, including the necessary fittings and all other items necessary and incidental to the completion of the work except the special fittings and appurtenances listed separately in the bid schedule. Payment for each special fitting and appurtenance will be made at the contract unit price for that type and size of fitting or appurtenance.

Method 7 For items of work for which specific lump sum prices are established in the contract, payment for corrugated metal pipe structures will be made at the contract lump sum prices. Such payment will constitute full compensation for furnishing, fabricating, transporting, and installing the pipe, fittings, and appurtenances, and all other items necessary and incidental to completion of the work, including, except as otherwise specified, required excavation, dewatering, and backfilling.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 8 of this specification.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Bid Item 5, Channel Piping

- (1) Work under this item consists of fabrication, excavation (if necessary), and installation of channel piping to grades shown on plans.
- (2) Materials specification 551, shall apply.
- (3) In Section 7, Measurement and Payment, Method 6, shall apply as per plan quantities as shown on bid schedule.
- (4) Bid Item 6, Pipe Gates, Specification 81 is related to this item and is compensated under that item.

b. Bid Item 4, Spillway Pipe System

- (1) Work under this item consists of all fabrication, excavation, aluminum pipe, fittings, coating, connections, collars, ladder, lid, rod, installation, etc, of principal Spillway Pipe System as shown on the plans and details to grades and inverts shown.
- (2) Materials Specification 552 shall apply.
- (3) In Section 7, Measurement and Payment, Method 7, shall apply.
- (4) Construction of concrete pier and riser pipe base Specification 32, is subsidiary to this item.
- (5) Construction of timber stop log structure, Specification 83, is subsidiary to this item.

CONSTRUCTION SPECIFICATION

61. LOOSE ROCK RIPRAP

1. SCOPE

The work shall consist of the construction of loose rock riprap revetments and blankets, including filter layers or bedding where specified.

2. MATERIALS

Rock for loose rock riprap shall conform to the requirements of Material Specification 523 or, if so specified shall be obtained from designated sources. It shall be free from dirt, clay, sand, rock fines and other materials not meeting the required gradation limits.

At least 30 days prior to delivery of rock from other than designated sources, the Contractor shall designate in writing the source from which he intends to obtain the rock and information satisfactory to the Contracting Officer that the material meets the requirements of the contract. The Contractor shall provide the Engineer free access to the source for the purpose of obtaining samples for testing. The size and grading of the rock shall be as specified in Section 9 of this specification.

Rock from designated sources shall be excavated, selected and processed as necessary to meet the quality and grading requirements in Section 9 of this specification. The rock shall conform to the specified grading limits when installed in the riprap.

Filter or bedding materials when required, shall, unless otherwise specified, conform to the requirements of Material Specification 521.

3. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap or bedding course is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall conform to the requirements of the specified class of fill.

Riprap shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by the Engineer.

4. EQUIPMENT-PLACED ROCK RIPRAP

The rock shall be placed by equipment on the surfaces and to the depths specified. The riprap shall be constructed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock shall be delivered and placed in a manner that will insure that the riprap in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks.

Riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required to the extent necessary to prevent damage to the permanent works.

5. HAND-PLACED RIPRAP

The rock shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact one to another. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on edge.

6. FILTER LAYERS OR BEDDING

When the drawings specify filter layers or bedding beneath riprap, the filter or bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth specified. Compaction of filter layers or bedding will not be required, but the surface of such layers shall be finished reasonably free of mounds, dips or windrows.

7. TESTING

The Engineer will perform such tests as are required to verify that the riprap, filter, and bedding materials and the completed work meet the requirements of the specifications. These tests are not intended to provide the Contractor with the information he needs to assure that the materials and workmanship meet the requirements of the specifications, and their performance will not relieve the Contractor of the responsibility of performing his own tests for that purpose.

8. MEASUREMENT AND PAYMENT

Method 1 For items of work for which specific unit prices are established in the contract, the volume of each type of riprap, including filter layers and bedding, will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. Payment for each type of riprap, including filter layers and bedding, will be made at the

contract unit price for that type of riprap. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

Method 2 For items of work for which specific unit prices are established in the contract, the volume of each type of riprap and the volume of each type of filter layer or bedding will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

Method 3 For items of work for which specific unit prices are established in the contract, the quantity of each type of riprap placed within the specified limits will be measured to the nearest ton by actual weight, and the volume of each type of filter layer or bedding will be measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. For each load of rock placed as specified, the Contractor shall furnish to the Engineer a statement-of-delivery ticket showing the weight, to the nearest 0.1 ton, of rock in the load.

Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the riprap, filter layers and bedding.

Method 4 For items of work for which specific unit prices are established in the contract, the quantity of each type of riprap placed within the specified limits will be measured to the nearest ton by actual weight, and the volume of each type of filter material or bedding delivered and placed within the specified limits will be measured to the nearest cubic yard by measurement of the hauling equipment. For each load of material placed as specified, the Contractor shall furnish to the Engineer a statement-of-delivery ticket showing the weight, to the nearest 0.1 ton, of rock in the load; or the volume, to the nearest 0.1 cubic yard, of filter material or bedding in the load.

Payment for each type of riprap will be made at the contract unit price for that type of riprap. Payment for each type of filter or bedding will be made at the contract unit price for that type of filter or bedding. Such payment will be considered full

compensation for all labor, materials, equipment and all other items necessary and incidental to completion of the riprap, filter layers and bedding.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 9 of this specification.

9. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

- a. Materials shall conform to IDOH specification indicated in the Special Requirements #5 and drawings.
- b. BID ITEM 12, Riprap
 - (1) This item of work consists of furnishing and installing of the rock comprising riprap shown on the drawings, placement into gabions shown including final earth shaping to grades and/or channels shown.
 - (2) Underlayment of Filter Fabric is included under Bid Item 14 and is compensated for under that item. (see Special Requirements #4 and Appendix).
 - (3) Top dressing of riprap with #53 stone as indicated on the drawings is included under Bid Item 15 and is compensated for under that item. (See Special Requirements #5).
 - (4) Riprap shall be equipment placed.
 - (5) In Section 8, Measurement and Payment, Payment will be made by Method 2, as per the plan quantities as shown on the Bid Schedule.

CONSTRUCTION SPECIFICATION

64. WIRE MESH GABIONS

1. SCOPE

The work shall consist of furnishing, assembling, and installing rock filled, wire mesh gabions and geotextile material or bedding as shown on the drawings.

2. MATERIALS

Gabion baskets, unless otherwise specified by Section 7, shall be a minimum of 11 gage (0.118 in - 3.00 mm) galvanized steel wire, fabricated into hexagonal triple-twist mesh openings no larger than $3\frac{1}{4}$ " x $4\frac{1}{2}$ ". Selvage wire running through all edges shall be a minimum of 9 gage (0.148 in - 3.76 mm) galvanized steel wire.

Lacing, tie and connecting wire shall be a minimum of 13½ gage (0.087 in - 2.21 mm) galvanized steel wire.

All wire shall conform to ASTM specification A 510, grade number 1006 through 1020. Wire shall have a minimum tensile strength of 60,000 lb/in² (413MPa) and a class 3 coating conforming to ASTM A 641. The galvanized coating will be applied by the hot dip process in accordance with ASTM A 385 and ASTM A 386.

Tolerance limits for height, length, and width shall be subject to plus or minus 5 percent of the manufacturer's stated sizes. Wire diameters shall be within a tolerance of 0.004 inches per ASTM A 641.

Rock, except for the shape and as otherwise specified in Section 7, shall conform to the quality requirements in Material Specification 523. Rock size and gradation shall be limited to those shown in the table below for gabion baskets 12 inches or greater in depth. Rock size and gradation limits for gabion baskets less than 12 inches in depth shall be as specified in Section 7.

<u>Gabion Size (in.)</u>	<u>Predominant Rock Size (in.)</u>	<u>Minimum Rock Dimension (in.)</u>	<u>Maximum Rock Dimension (in.)</u>
12 Deep Basket	4 to 8	3	10
18 and 36 Deep Baskets	4 to 8	3	12

After the contractor has determined the rock meets the specification and at least 30 days prior to delivery to the site, the contractor shall inform the Engineer in writing of the source from which the rock will be obtained, and include the test data and other information by which he determined the material to be satisfactory. The contractor shall provide the engineer free access to the source for the purpose of obtaining samples for testing and source approval.

Bedding of aggregate, geotextiles or other materials shall conform to the requirements specified in Section 7.

3. FOUNDATION PREPARATION

The foundation on which the gabions, are to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill is required, it shall consist of approved materials and shall conform to the specified requirements. Vegetation, surface irregularities, and loose material shall be removed from foundations. Gabions, geotextile material and bedding shall not be placed until the foundation preparation is completed, and the subgrade surfaces have been inspected and approved by the engineer.

4. GABIONS

Assembly of gabions shall consist of shaping and tying each individual basket. Where the length of the gabion exceeds its horizontal width, the gabion shall be equally divided by diaphragms into cells whose length does not exceed the basket horizontal width. Diaphragms shall be fabricated of the same mesh and gauge as the body of the gabions. The gabion shall be furnished with the necessary diaphragms secured in proper position on the base in such a manner that no additional tying at this juncture will be necessary. Each gabion basket shall be assembled by tying all untied edges, including diaphragms, with lacing wire in accordance with one of the following two methods:

Lacing shall be used for both the assembly of baskets and connecting baskets together unless otherwise specified in Section 7. The lacing procedure consists of cutting a length of lacing wire approximately 1 1/2 times the distance to be laced (not to exceed 5 feet), securing one end of the wire at the corner by looping and twisting, alternately lacing with single and double loops at approximately four (4) inch intervals, and securing the other end of the wire to selvages by looping and twisting.

Looping, when specified in Section 7, will be permitted as an alternative to lacing only for the assembly of each individual basket unit. The loop procedure consists of cutting an adequate length of lacing wire for a triple loop and securely twisting the ends of wire a minimum of five (5) twists after looping. The maximum spacing between loop ties shall be ten (10) inches with a minimum of three (3) ties per edge.

Placing of gabions shall consist of installing baskets to the lines and grades shown on the drawings. Gabions shall be securely tied to each adjoining gabion with lacing wire along the vertical reinforced edges and the top selvages. Empty gabion sections stacked on a filled line of gabions shall be tightly laced to the latter along the front

and back. When the upper section only partially overlaps the lower section, the lacing shall be done along the line where the front edge of the upper section meets the lower section, and where the back edge of the lower section meets the base of the upper section. For the end sections only, the layer of empty gabions placed on top of filled gabions must be wired to the latter at the front, back and external lateral edge.

Prior to placement of rock, the baskets used in retaining walls shall be stretched. If necessary, the gabions shall be temporarily staked to maintain proper alignment. Staking through geotextile material will not be allowed. Connecting wires shall be attached during the filling operation to preserve the strength and shape of the structure.

FILLING OPERATION

The gabions shall be carefully filled with rock, by either hand or machine placement, unless otherwise specified in Section 7, to ensure alignment, avoid bulges, and provide a compact mass with a minimum of voids. Machine placement may have to be supplemented with hand work to ensure a neat, compact, square appearance.

Cells in rows shall be filled in stages such that the depth of rock placed in any cell does not exceed the depth in an adjoining cell by more than one foot. Rock smaller than 4 inches showing on visible faces shall be rodged into or removed from the gabion prior to any earth backfilling.

The placement of rock in gabions, including the installation of connecting wires, shall be performed in the following sequence for the depth of gabions indicated.

a. 36-inch Deep Gabions.

(1) Fill gabions to a depth of 12 inches.

(2) Tightly tie one connecting wire in each direction to opposite faces of each gabion cell at a 12-inch height above the base except for exposed cell faces. Two connecting wires evenly spaced shall be used in lieu of one between an exposed front face and the opposite back face.

(3) Fill gabions another 12 inches and tightly tie connecting wires to opposite faces of each gabion at this level as described in step 2 above.

(4) Complete filling of gabions to the top.

b. 18-inch and 12-inch Deep Gabions

(1) Connecting wires are not necessary in the 12-inch size.

(2) Connecting wires are necessary in the 18-inch size gabion only when it is used to construct vertical structures.

(3) When connecting wires are required, tightly tie connecting wires to the opposite face, at 9 inches above the base as described for the 36-inch deep gabions, after filling with rock to this level.

All connecting wires shall be looped around two mesh openings and the ends of the wires shall be securely twisted with a minimum of five (5) twists after looping.

When the gabion has been filled, the lid shall be bent and stretched until it meets the perimeter edges of the front and end panels. To assist in closing and lacing, a pinch bar or special closing tool may be used. The lid shall then be tightly laced with lacing wire to the edges of the front and end panels. The lids shall also be securely tied to each adjoining gabion with lacing wire along all contact edges. Lacing adjacent lids to the vertical panels in one operation is acceptable. Lacing the back edge of the lid to adjoining gabions shall be done prior to filling the gabion. The lid shall be tied to each diaphragm by lacing wire. Lacing shall be performed in the same manner as described in Section 4.

6. MEASUREMENT AND PAYMENT

Method 1 For items of work for which specific unit prices are established in the contract, the volume of rock will be measured within the neat lines of the gabion structure and computed to the nearest cubic yard. The measurement for gabions will be the number of each size satisfactorily placed. Payment will be made at the contract unit price for each item. Such payment will be considered full compensation for all labor, materials, equipment, and all other items necessary and incidental to the installation of the rock filled gabions. No deduction in volume shall be made for any void or embedded item that is less than five (5) cubic feet in volume.

Method 2 For items of work for which specific unit prices are established in the contract, the volume of rock will be measured within the neat lines of the gabion structure and computed to the nearest cubic yard. Payment for the rock will be made at the contract unit price, and include the wire mesh gabions, and bedding, specified. Such payment will be considered full compensation for all labor, materials, equipment, and all other items necessary and incidental to the work. No deduction in volume shall be made for any void or embedded item that is less than five (5) cubic feet in volume.

All Methods The following provisions apply to both methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Each item and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Bid Item 13, Gabions

- (1) This item of work consists of furnishing, installing, and filling gabions to grades and locations shown on the plans.
- (2) Compensation for furnishing riprap is included in Bid Item 12.
- (3) Payment is to be made by Method 1 in Part 6. Measurement and Payment as per Plan Quantities as shown on the Bid Schedule. (Note: Gabion plan quantity is represented in square yard units.)
- (4) Materials shall conform to that specified in the special requirements, 2 & 3, and the appendix.
- (5) Installation instructions are further described in the Appendix.
- (6) Filter Fabric is required and is specified in Special Requirements #4 and is compensated under Bid Item 14.

CONSTRUCTION SPECIFICATION

81. METAL FABRICATION AND INSTALLATION

1. SCOPE

The work shall consist of furnishing, fabricating and erecting metalwork, including the metal parts of composite structures.

2. MATERIALS

Unless otherwise specified, materials shall conform to the requirements of Material Specification 581. Steel shall be structural quality unless otherwise specified. Castings shall be thoroughly cleaned and subjected to careful inspection before installation. Finished surfaces shall be smooth and true to assure proper fit. Galvanizing shall conform to the requirements of Material Specification 582.

3. FABRICATION

Fabrication of structural steel shall conform to the requirements of Section 1.23 of the "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (Riveted, Bolted and Arc-Welded Construction)," American Institute of Steel Construction.

Fabrication of structural aluminum shall conform to the requirements in the Aluminum Construction Manual, "Specifications for Aluminum Structures," Section 6 and Section 7, The Aluminum Association, November 1976.

4. ERECTION

The frame of metal structures shall be carried up true and plumb. Temporary bracing shall be placed wherever necessary to resist all loads to which the structure may be subjected, including those applied by the installation and operation of equipment. Such bracing shall be left in place as long as may be necessary for safety.

As erection progresses the work shall be securely bolted up, or welded, to resist all dead load, wind and erection stresses. The Contractor shall furnish such fitting up bolts, nuts and washers as may be required.

No riveting or welding shall be done until as much of the structure as will be stiffened thereby has been properly aligned.

Rivets driven in the field shall be heated and driven with the same care as those driven in the shop.

All field welding shall be done in conformance to the requirements for shop fabrication, except those that expressly apply to shop conditions only.

Galvanized items shall not be cut, welded or drilled after the zinc coating is applied.

5. PROTECTIVE COATINGS

Items specified to be galvanized shall be completely fabricated for field assembly before the application of the zinc coatings.

Items specified to be painted shall be painted in conformance to the requirements of Construction Specification 82 for the specified paint systems.

6. MEASUREMENT AND PAYMENT

Method 1 The work will not be measured. Payment for metal fabrication and installation will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, materials, equipment and all other items necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers and weld metal.

Method 2 The weight of metal installed complete in place shall be determined to the nearest pound. Unless otherwise provided, the weight of metal shall be computed by the method specified in Section 3 of the "Code of Standard Practice for Steel Buildings and Bridges," American Institute of Steel Construction, except that the following unit weights shall also be used, as appropriate, as the basis of computation:

<u>Material</u>	<u>Unit Weight</u> <u>Pounds per Cubic Foot</u>
Aluminum alloy	173.0
Bronze or copper alloy	536.0
Iron, malleable	470.0
Iron, wrought	487.0

Payment for furnishing, fabricating and installing metalwork will be made at the contract unit price for the specified types of labor, materials, equipment and all other items necessary and incidental to the completion of the work.

Method 3 The work will not be measured. Payment for furnishing, fabricating and installing each item of metalwork will be made at the contract price for that item. Such payment will constitute full compensation for all labor, materials, equipment and all other items

necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers and weld metal.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Bid Item 6, Pipe Gates.

- (1) This work consists of fabrication, painting, and installation of pipe Gates indicated on the drawings to control water flow in the channel piping.
- (2) In section 6, Measurement and payment, Method 3, shall apply.

CONSTRUCTION SPECIFICATION

83. TIMBER FABRICATION AND INSTALLATION

1. SCOPE

The work shall consist of the construction of timber structures and timber portions of composite structures.

2. MATERIALS

Structural timber and lumber shall conform to the requirements of Material Specification 584. Treated timber and lumber shall be impregnated with the specified type and quantity of preservative and in the manner specified in Material Specification 585.

Hardware, except cast iron, shall be galvanized as specified for iron and steel hardware in Material Specification 582. Unless otherwise specified, structural steel shapes, plates and rods shall not be galvanized. Nuts, driftbolts, dowels and screws shall be either wrought iron or medium steel.

Steel bolts shall conform to the requirements of ASTM Specification A 307. When galvanized or zinc-coated bolts are specified, the zinc coating shall conform to the requirements of Material Specification 582.

Washers shall be ogee gray iron castings or malleable iron castings unless washers cut from medium steel or wrought iron plate are specified on the drawings. Cast washers shall have a thickness equal to the diameter of the bolt and a diameter equal to four times the thickness. For plate washers the thickness shall be equal to one-half the diameter of the bolt, and the sides of the square shall be equal to four times the diameter of the bolt. Holes in washers shall be not more than one-eighth inch greater in diameter than the bolt. Split ring connectors, tooth ring connectors and pressed steel shear plate connectors shall be manufactured from hot-rolled, low carbon steel conforming to the requirements of ASTM Designation A-711, Grade 1015. Malleable iron shear plate connectors and spike grid connectors shall be manufactured in conformance with the requirements of ASTM Designation A 47, Grade No. 35018. All connectors shall be of approved design and the type and size specified.

Structural shapes, rods and plates shall be structural steel conforming to the requirements of Material Specification 581. No welds will be permitted in truss rods or other main members of trusses or girders.

3. WORKMANSHIP

All framing shall be true and exact. Timber and lumber shall be accurately cut and assembled to a close fit and shall have even bearing over the entire contact surfaces. No open or shimmed joints will be accepted. Nails and spikes shall be driven with just sufficient force to set the heads flush with the surface of the wood. Deep hammer marks in wood surfaces shall be considered evidence of poor workmanship and sufficient cause for rejection of the work.

Holes for round driftpins and dowels shall be bored with a bit one-sixteenth inch smaller in diameter than that of the driftpin or dowel to be used. The diameter of holes for square driftpins or dowels shall be equal to one side of the driftpin or dowel. Holes for machine bolts and rods shall be bored with a bit not larger than the body of the screw at the base of the thread.

Washers shall be used in contact with all bolt heads and nuts that would otherwise be in contact with wood. Cast iron washers shall be used when the bolt will be in contact with earth. All nuts shall be checked or burred effectively with a pointed tool after finally tightened.

Unless otherwise specified, surfacing, cutting and boring of timber and lumber shall be done before treatment. If cutting of treated timber and lumber is authorized, all cuts and abrasions shall be carefully trimmed and coated with not less than three brush coats of a wood preservative containing, by weight, not less than 5 percent pentachlorophenol.

All recesses and holes cut or bored in treated timber and lumber shall be swabbed with not less than three coats of a wood preservative containing, by weight, not less than 5 percent pentachlorophenol. After field treatment any unfilled holes shall be plugged with tightly fitting wooden plugs as treated above for cuts, abraisions and holes.

4. HANDLING AND STORING MATERIALS

All timber and lumber stored at the site of the work shall be neatly stacked on supports at least twelve inches above the ground surface and protected from the weather by suitable covering. Untreated material shall be so stacked and stripped as to permit free circulation of air between the tiers and courses. Treated timber shall be close-stacked. The ground underneath and in the vicinity of all stacks shall be cleared of weeds and rubbish. The use of cant hooks, peavies, or other pointed tools, except end hooks will not be permitted in the handling of structural timber or lumber. Treated timber shall be handled with rope slings or other methods that will prevent the breaking or bruising of outer fibers, or penetration of the surface in any manner.

5. PAINTING

Except as otherwise specified, surfaces designated for painting shall be painted in accordance with Construction Specification 84.

6. MEASUREMENT AND PAYMENT

Method 1 The unit of measurement of lumber and timber will be the number of thousand feet board measure (MBM) of each type, size, species and grade of lumber and timber in place in the completed structure. The quantity of each type, size, species and grade will be computed from the nominal dimensions and actual lengths of the pieces in the completed structure and will not include waste timber used for erection purposes (such as falsework or temporary sheeting and bracing) or any portion of any pile or other round timber. The total quantity of lumber and timber in each type, size, species and grade will be computed to the nearest 0.01 MBM.

The unit of measurement of plywood will be the number of square feet of each type, species, grade and thickness in place in the completed structure.

Payment for each type, size, species and grade of lumber and timber will be made at the contract unit price for that type, size, species and grade. Payment for each type, species, grade and thickness of plywood will be made at the contract unit price for that type, species, grade and thickness. Such payment will be considered full compensation for all labor, equipment, transportation and materials and all other items necessary and incidental to the completion of the structure in place including hardware and accessories, paint and wood preservatives.

Method 2 No measurement of material quantities will be made. Payment for each structure, complete in place, will be made at the contract lump sum price for that structure. Such payment will be considered full compensation for all labor, transportation, equipment and materials and all other items necessary and incidental to the completion of the work.

Method 3 For items of work for which specific unit prices are established in the contract, measurement and payment for each structure unit, except those for which a linear foot payment is established, will be counted and payment made at the contract unit price. Items for which a linear foot payment is established will be measured to the nearest linear foot and payment will be made at the contract unit prices appropriate. Such payment will be considered full compensation for all labor, equipment, transportation, materials and all other items necessary and incidental to the completion of the structure in place, including hardware and accessories, paint and woods preservatives.

All Methods The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 7 of this specification.

7. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Subsidiary to Bid Item 4, Spillway Pipe System.

- (1) This work consists of furnishing, fabricating, and installing the stop log lumber as described in the drawings to the proposed elevations shown.
- (2) Use 4"x6" CCA, T&G, Southern Yellow Pine.
- (3) Compensation is included under Bid Item 4.

LANDSCAPE CONSTRUCTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide trees, plants, erosion control and ground cover as indicated on the Drawings, specified herein, and needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General conditions, Supplementary Conditions, and Sections of the Specification.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirement and the methods needed for proper performance of the work of this Section.
- B. Standards:
 - 1. Plants and planting material: Meet or exceed the specifications of Federal, State, and County Laws requiring inspection for plant disease and insect control.
 - 2. Quality and size: Comply with current edition of "Horticultural Standards" for nursery stock as adopted by American Association of Nurserymen.
 - 3. All plants:
 - a. True to name, with one of each bundle or lot tagged with the name and size of the plants in accordance with standards of practice of American Association of Nurserymen.
 - b. In all cases, botanical names take precedence over common names.
 - c. Be northern grown at the same zone or latitude of the project site.
 - d. From a source acceptable to the Landscape Architect and the Owner.
 - e. At the Owners option, plants may be tagged by the Landscape Architect, with the Contractor present.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of other Sections.
- B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Complete materials list of items proposed to be provided under this Section.
 - 2. Complete data on source, size, and quality.
 - 3. Sufficient data to demonstrate compliance with the specified requirements.
- C. Certificates
 - 1. Require certificates required by law to accompany shipments.
 - 2. Upon completion of the installation, deliver certificates to the Landscape Architect or Owner's Representative.

1.4 PRODUCT HANDLING

- A. Comply with pertinent provisions. ?
- B. Immediately remove from the site plants which are not true to name, and materials which do not comply with the specified requirements, and promptly replace with plants and materials meeting the specified requirements.

PART 2 - PRODUCTS

2.1 FERTILIZER

- A. Provide commercial balanced 16-8-8 fertilizer delivered to the site in bags labeled with the manufacturer's guaranteed analysis. Bulk application will be acceptable for large areas. (Provide certification of guaranteed analysis.)

2.2 SOIL AMENDMENT

- A. Provide commercial bagged Michigan peat.

2.3 MULCH

- A. Provide shredded hardwood mulch of medium-heavy texture, free of large chunks, leaves and twigs.

2.4 TREE STAKES

- A. Unless otherwise indicated on the Drawings, provide hardwood stakes, Construction grade, rough sawn, 2 x 2" x 8 ft. long.

2.5 EROSION CONTROL MATERIAL

- A. TYPE 1: Erosion Control blankets by North American Green type S150 (see appendix.) Installation shall be as per factory instructions.

2.6 PLANT MATERIALS

- A. Provide the plant materials shown on the schedule in the Drawings.

2.7 TOPSOIL

- A. Provide sandy loam topsoil 2 inches in depth typical of the area, free of stones, debris and compaction with minimum of 2% organic matter; available on site.

2.8 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation as selected by the Contractor subject to the approval of the Engineer.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.3 PLANTING TREES AND SHRUBS

A. General:

1. Plant nursery stock immediately upon delivery to the site and approval by the Landscape Architect except that, if this is not feasible, heel-in all bare root and balled materials with damp soil and protect from sun and wind.
2. Regularly water nursery stock in containers, and place them in a cool area protected from sun and drying winds.

B. Excavating:

1. For shrubs in one gal containers, dig a hole 12" in diameter and 12" deep.
2. For shrubs and trees in five gal containers, dig a hole 20" in diameter and 18" deep.

3. For trees in 15 gal containers, dig a hole 30" in diameter and 30" deep.
4. For large tree balls, dig a hole 24 inches in diameter larger than ball.

C. Planting:

1. Fill holes with backfill mixture consisting of three parts topsoil and one part specified soil amendment, by volume. Remove soil and/or debris excavated from hole from the site.
2. Fill to proper height to receive the plant, and thoroughly tamp the mixture before setting the plant.
3. Set plant in upright position in the center of the hole, and compact the backfill mixture around the ball or roots.
4. Thoroughly water each plant when the hole is 2/3 full.
5. After watering, tamp the soil in place until the surface of the backfill is level with the surrounding area and the crown of the plant is at the finished grade of the surrounding area.
6. Build up a temporary watering basin around the base of each tree and shrub, unless otherwise directed by the Engineer.

- D. Apply the specified mulch to a depth of 3", evenly spread over the entire area of each soil basin. No mulch is required below elevation 103.

3.4 PLANTING HYDRIC PLANT MATERIALS

- A. Plant as per suppliers instructions.

3.5 STAKING

- A. Stake trees, using one stake per tree with two tree ties per stake and driving stakes into the ground at least two feet.

3.7 INSPECTION

- A. In addition to normal progress observations, schedule and conduct the following formal inspections, giving the Engineer at least 24 hours advance notice of readiness for inspection:
1. Inspection of plants in containers prior to planting.
 2. Inspection of plant locations, to verify compliance with the Drawings.

3. Final inspection after completion of planting:
 - a. Schedule this inspection sufficiently in advance, and in cooperation with the Engineer, so final inspection may be conducted within 24 hours after completion of planting.
4. Final inspection at the end of the maintenance period, provided that previous deficiencies have been corrected.

3.8 MAINTENANCE

- A. Maintain planting, starting with the planting operations and continuing for 30 calendar days after planting is complete and approved by the Engineer.
- B. Work included:
 1. Watering, weeding, cultivating, spraying, and pruning necessary to keep the plant materials in a healthy growing condition and to keep the planted areas neat and attractive throughout the maintenance period.
 2. Provide equipment and means for proper applications of water.
 3. Protect planted areas against damage, including erosion and trespassing, by providing and maintaining proper safeguards.
- C. Replacements:
 1. At the end of the maintenance period, all plant material shall be in healthy growing condition.
 2. During the maintenance period, should the appearance of any plant indicate weakness and probability of dying, immediately replace that plant with a new and healthy plant of the same type and size without additional cost to the Owner.
 3. Replacement required because of causes beyond control of the Contractor are not part of the Contract.
- D. Extension of maintenance period:
 1. Continue the maintenance period at no additional cost to the Owner until previously noted deficiencies have been corrected, at which time an inspection for provisional acceptance will be made.
- E. Guarantee:
 1. All plant material to be in healthy, vigorous condition for one year from date of provisional acceptance. Items rejected will be replaced at no additional cost to the Owner.
 2. Only one replacement will be required per location.

3. During the guarantee period, the Contractor will inspect the plantings periodically to determine any conditions or maintenance requirements affecting the acceptance of the plantings at the end of the guarantee period, and advise the Owner in writing of these observations. Therefore, no remedy will be due the Contractor for replacements due to maintenance reasons.

3.9 METHOD OF MEASUREMENT

- A. The erosion control fabric will be measured on a per square yard basis. Shredded wood mulch will not be measured. Topsoil will not be measured.

3.10 BASIS OF PAYMENT

- A. The erosion control fabric will be paid for on a per square yard basis. All remaining work described in this specification shall be paid for on a lump sum basis as indicated on the bid schedule.
- B. Compensation for the items of work necessary for installation of the erosion control blanket is included under Bid Item 17.
- C. Compensation for all other work described in this section is included under Bid Item 18.
- D. Seeding and Sodding of disturbed area, Specification 02495 is subsidiary to Bid Item 18.

SECTION 02495
SEEDING AND SODDING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide either or both plain and mulch seeding, broadcast seeding. It includes furnishing and placing seed, fertilizer, topsoil and mulch in a prepared seedbed at locations shown on the plans.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.
- B. It is the intent of this Seeding and Sodding Specification to require the Contractor to water the seeded areas as many times as necessary to insure a good, growing finished product at the completion of the project.
- C. The watering of the seed and sod shall continue until germination has been achieved and a satisfactory growth of new grass is achieved as determined by the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials shall conform to the following requirements as specified in the following subsections of the Indiana Dept. of Highways Standard Specifications:

Fertilizers913.03
Water913.09 (a)
Mulch913.05 (a)
Sod913.07

SEED MIXTURE See page SR-2

PART 3- EXECUTION

3.1 PREPARATION OF GROUND BEFORE SEEDING

- A. The area to be seeded shall be made smooth and uniform and shall conform with the finished grade and cross section shown on the plans. It shall have been given final trimming. No soil to be seeded shall be tilled when in a wet or muddy conditions.
- B. The seedbed, if not loose, shall be loosened to a minimum depth of three (3) inches before fertilizer and seed is applied. Where soil is highly subject to erosion and to receive erosion control blanket, one (1) inch depth of tillage is required.

3.2 FERTILIZING, SEEDING AND MULCHING

- A. Fertilizer shall be applied and spread uniformly over the area to be seeded at a rate of 400 pounds per acre.
- B. Seed may be broadcast, drilled, or mixed with water and the mixture sprayed over the area to be seeded. An approved mechanical method to place the seed in direct contact with the soil may be used.
- C. Those seeded areas so designated shall be thoroughly mulched by a method approved by the Engineer. Mulching material, when specified, shall be applied uniformly in a continuous blanket at a rate of two tons per acre, except wood cellulose fiber mulch shall be applied at a rate of 1,500 pounds per acre.
- D. Mulching material shall be punched into the soil so that it is partially covered. The punching operation shall be performed longitudinally with a mulch tiller, or crimper.
- E. After procedures for holding the mulch in place have been completed, mulch (other than when applied by hydroseeder) shall be watered thoroughly. The seed or soil beneath it shall not be displaced. The mulching material shall be maintained in place satisfactorily until final completion and acceptance of the project.
- F. When seeding is performed between June 1 and August 15, a second thorough watering shall be applied approximately 20 days after the seeding. Watering shall be done in such a manner as to not displace the seed, or soil underneath it.

3.6 SEASONAL LIMITATIONS

- A. Seeding will be permitted only from February 1 to November 15. Seeding without mulch shall not be done between May 1 and August 15. During other periods, the time of sowing shall be determined by the Engineer, whose decisions will be based upon soil moisture and weather conditions.

3.7 LIMITS OF SEEDING

- A. The limits of seeding shall be all those areas shown on the drawings and also as indicated as Landscape Restoration.

3.9 BASIS OF PAYMENT

- A. Subsidiary to Bid Item 18, Landscape Restoration

- (1) This item of work includes seeding of all disturbed areas as per this specification.

- (2) Compensation is included under Bid Item 18.

- B. It is the intent of this specification to require the Contractor to provide to the Owner good, live, growing grass areas at the completion of the project. Contractor shall reseed all areas necessary at no additional expense to the Owner. Contractor shall provide all necessary watering to meet this intent.

MATERIAL SPECIFICATION

522. AGGREGATE FOR PORTLAND CEMENT CONCRETE

1. SCOPE

This specification covers the quality of fine aggregate and coarse aggregate for use in the manufacture of portland cement concrete.

2. QUALITY

Aggregate shall conform to the requirements of ASTM Specification C-33 for the specified sizes. Aggregates that fail to meet any requirement may be accepted only when: (1) the specified alternate conditions of acceptance can be proved prior to the use of the aggregates on the job and within a period of time such that no work under the contract will be delayed by the requirements of such proof; or, (2) the specification for concrete expressly contains a provision of special mix requirements to compensate for the effects of the deficiencies.

3. REACTIVITY WITH ALKALIES

The potential reactivity of aggregates with the alkalis in cement shall be evaluated by petrographic examination and, where applicable, the chemical method of test, ASTM Designation C 289, or by the results of previous tests or service records of concrete made from similar aggregates from the same source. The standards for evaluating potential reactivity shall be as described in ASTM Specification C 33, Appendix A1.

Aggregates indicated by any of the above to be potentially reactive shall not be used, except under one of the following conditions:

- a. Applicable test results of mortar bar tests, made according to ASTM Method C 227, are available which indicate an expansion of less than 0.10 percent at six months in mortar bars made with cement containing not less than 0.8 percent alkalis expressed as sodium oxide; or
- b. Concrete made from similar aggregates from the same source has been demonstrated to be sound after 3 years or more of service under conditions of exposure to moisture and weather similar to those anticipated for the concrete under these specifications.

Aggregates indicated to be potentially reactive, but within acceptable limits as determined by mortar bar test results or service records, shall be used only with "low alkali" cement, containing less than 0.60 percent alkalis expressed as sodium oxide.

4. STORING AND HANDLING

Aggregate of each class and size shall be stored and handled by methods that prevent segregation of particles sizes or contamination by intermixing with other materials.

MATERIAL SPECIFICATION

531. PORTLAND CEMENT

1. SCOPE

This specification covers the quality of portland cements.

2. QUALITY

Portland cement shall conform to the requirements of ASTM Specification C 150 for the specified types of cement, except that, when Type I portland cement is specified, Type IS portland blast-furnace slag cement or Type IP portland-pozzolan cement conforming to the requirements of ASTM Specification C 595 may be used unless prohibited in the specifications.

If air-entraining cement is to be used, the Contractor shall furnish the manufacturer's written statement giving the source, amount and brand name of the air-entraining addition.

3. STORAGE AT THE CONSTRUCTION SITE

Cement shall be stored in such a manner as to be protected from weather, dampness or other destructive agencies. Cement that is partially hydrated or otherwise damaged will be rejected.

MATERIAL SPECIFICATION

551. ZINC-COATED IRON OR STEEL CORRUGATED PIPE

1. SCOPE

This specification covers the quality of zinc-coated iron or steel corrugated pipe and fittings.

2. PIPE

Zinc-coated iron or steel corrugated pipe and fittings shall conform to the requirements of Federal Specification WW-P-405 for the specified classes and shapes of pipe, and to the following additional requirements:

- a. Unless otherwise specified, circumferential shop riveted seams shall have a maximum rivet spacing of 6 inches, except that 6 rivets will be sufficient for 12-inch diameter pipe;
- b. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe, and (2) in those portions of the longitudinal seams that will be covered by the coupling bands the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating of the coupling bands.
- c. Double riveting or double spot welding for pipe less than 42 inches in diameter may be required. When double riveting or double spot welding is specified, the riveting or welding shall be done in the manner specified for pipe 42 inches or greater in diameter.

3. COATINGS

Coatings shall conform to the requirements of Federal Specification WW-P-405 for the specified types of coatings.

MATERIAL SPECIFICATION

552. ALUMINUM CORRUGATED PIPE

1. SCOPE

This specification covers the quality of aluminum corrugated pipe and fittings.

2. PIPE

Aluminum corrugated pipe and fittings shall conform to the requirements of Federal Specification WW-P-402 for the specified classes and shapes of pipe, and to the following additional requirements:

- a. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe; and (2) in those portions of the longitudinal seams that will be covered by the coupling bands the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating of the coupling bands.
- b. Double riveting of pipe less than 42 inches in diameter or double spot welding of pipe less than 30 inches in diameter may be required.

When double riveting or double spot welding is specified, the riveting or welding shall be done in the manner specified for pipe of greater diameter.

3. COATINGS

Coatings shall conform to the requirements of Federal Specification WW-P-402 for the specified types of coatings.

MATERIAL SPECIFICATION

581. METAL

1. SCOPE

This specification covers the quality of steel and aluminum alloys.

2. STRUCTURAL STEEL

Structural steel shall conform to the requirements of ASTM Specification A 36.

High-strength low-alloy structural steel shall conform to ASTM Specification A 242 or A 588.

Carbon steel plates of structural quality to be bent or formed cold shall conform to ASTM Specification A 283, Grade C.

Carbon steel sheets of structural quality shall conform to ASTM Specification A 570, Grade D or A 611, Grade D.

Carbon steel strip of structural quality shall conform to ASTM Specification A 570, Grade C.

3. COMMERCIAL OR MERCHANT QUALITY STEEL

Commercial or merchant quality steel shall conform to the requirements of the applicable ASTM specifications listed below:

<u>Product</u>	<u>ASTM Specification</u>
Carbon steel bars	A 575, Grade M 1015 to Grade M 1031
Carbon steel sheets	A 569
Carbon steel strip	A 569
Zinc-coated carbon steel sheets	A 526

4. ALUMINUM ALLOY

Aluminum alloy products shall conform to the requirements of the applicable ASTM specifications listed below. Unless otherwise specified, alloy 6061-T6 shall be used.

<u>Product</u>	<u>ASTM Specification</u>
Standard structural shape	B 308
Extruded structural pipe and tube	B 429

Extruded bars, rods, shapes and tube	B 221
Drawn seamless tubes	B 210
Rolled or cold-finished bars, rods and wire	B 211
Sheet and plate	B 209

5. Bolts

Steel bolts shall conform to the requirements of ASTM Specification A 307. If high-strength bolts are specified they shall conform to the requirements of ASTM Specification A 325.

When galvanized or zinc-coated bolts are specified, the zinc coating shall conform to the requirements of ASTM Specification A 153; except that bolts 1/2 inch or less in diameter may be coated with electrodeposited zinc or cadmium coating conforming to the requirements of ASTM Specification B 633, Service Condition SC 3 or ASTM Specification A 165, Type TS, unless otherwise specified.

6. RIVETS

Unless otherwise specified, steel rivets shall conform to the requirements of ASTM Specification A 502, Grade 1. Unless otherwise specified, aluminum alloy rivets shall be Alloy 606-T6 conforming to the requirements of ASTM Specification B 316.

7. WELDING ELECTRODES

Steel welding electrodes shall conform to the requirements of American Welding Society specification AWS A5.1, "Specification for Mild Steel Covered Arc-Welding Electrodes," except that they shall be uniformly and heavily coated (not washed) and shall be of such a nature that the coating will not chip or peel while being used with the maximum amperage specified by the manufacturer.

Aluminum welding electrodes shall conform to the requirements of American Welding Society specification AWS A5.10, "Specification for Aluminum and Aluminum-Alloy Welding Rods and Bare Electrodes."

MATERIAL SPECIFICATION

582. GALVANIZING

1. SCOPE

This specification covers the quality of zinc coatings applied to iron and steel products.

2. QUALITY

Zinc coatings shall conform to the requirements of ASTM Specification A 123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products or as otherwise specified in the items of work and construction details of the Construction Specification.

ASTM A 123 covers both fabricated and unfabricated products e.g., assembled steel products, structural steel fabrications, large tubes already bent or welded before galvanizing, and wire work fabricated from uncoated steel wire. It also covers steel forgings and iron castings incorporated into pieces fabricated before galvanizing or which are too large to be centrifuged (or otherwise handled to remove excess galvanizing bath metal). Items to be centrifuged or otherwise handled to remove excess zinc shall meet the requirements of ASTM A 153, except: Bolts, screws and other fasteners 1/2 inch or less in diameter may be coated with electrodeposited zinc or cadmium coating conforming to the requirements of ASTM Specification A 165, Type TS, or ASTM Specification B 633, Service Condition SC-3 unless otherwise specified.

APPENDIX

*** Construction Standards**

Product Specifications

SPECIFIED

TYPICAL ROLL PROPERTIES

PROPERTY	TEST PROCEDURE	UNIT	POLYFELT																PGM			
MECHANICAL			TS 420	TS 500	TS 550	TS 600	TS 650	TS 700	TS 750	TS 800	TS 900	TS 1000	13	15	20							
Grab Tensile	ASTM D4632	lbs.	100	125	150	165	190	225	285	325	390/320	420/340	100	120	160							
Grab Elongation	ASTM D4632	%	> 50	> 50	> 50	> 50	> 50	> 50	> 50	> 60	85/90	90/95	> 50	> 50	> 50							
Puncture	ASTM D4833	lbs.	55	65	70	90	100	120	130	150	155	160	55	65	90							
Trapezoidal Tear	ASTM D4533	lbs.	50	60	70	75	85	100	120	135	150/140	160/150	50	60	75							
Mullen Burst	ASTM D3786	psi	155	200	230	255	295	345	425	450	460	475										
HYDRAULIC																						
Water Flow Rate	ASTM D4491	gpm/ft ²	250	220	190	170	140	130	100	90	80	65										
Permittivity	ASTM D4491	sec ⁻¹	2.9	2.7	2.3	2.0	1.8	1.6	1.3	1.2	0.9	0.8										
Permeability, k	ASTM D4491	cm/sec	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.35	0.35										
A.O.S.	ASTM D4751	sieve size	70-35	80-40	80-45	100-60	100-70	120-80	140-100	140-100	> 140	> 140										
		mm	0.2-0.5	0.18-0.42	0.18-0.35	0.15-0.25	0.15-0.21	0.12-0.18	0.10-0.15	0.10-0.15	< 0.10	< 0.10										
PHYSICAL																						
Fabric Weight	ASTM D3776	oz./yd. ²	3.8	4.5	5.5	6.0	7.0	8.3	10.3	12.0	14.0	16.2	3.8	4.5	6.0							
Thickness	ASTM D1777	mils	55	60	70	80	90	105	120	130	150	170	55	60	80							
U V Resistance (500 hours)	ASTM D4355	% strength retained	> 80	> 80	> 80	> 80	> 80	> 80	> 80	> 80	> 80	> 80	> 80	> 80	> 80							
pH Resistance			2-13	2-13	2-13	2-13	2-13	2-13	2-13	2-13	2-13	2-13	2-13	2-13	2-13							
Asphalt Retention	T.F. 25	gal./yd. ²											0.20	0.25	0.30							

MINIMUM AVERAGE ROLL PROPERTIES

PROPERTY	TEST PROCEDURE	UNIT	90	110	130	145	170	205	260	300	310	320	90	110	145
Grab Tensile	ASTM D4632	lbs.	90	110	130	145	170	205	260	300	310	320	90	110	145
Puncture	ASTM D4833	lbs.	45	50	60	75	85	100	115	130	135	140	45	50	75
Trapezoidal Tear	ASTM D4533	lbs.	45	50	60	70	80	95	110	120	130	140	45	50	70
Mullen Burst	ASTM D3786	psi	135	160	200	220	260	300	380	400	420	450			

PACKAGING

ROLL															
Width, ft.	15	15	15	15	15	15	14	13	10	10	12.5	12.5	12.5		
Length, ft.	360	360	360	360	360	360	300	300	300	300	360	360	360		
Area, yd. ²	600	600	600	600	600	600	467	433	333	333	500	500	500		
Weight, lbs	150	180	215	235	275	320	310	335	300	345	130	150	200		

Nonstandard roll dimensions are available on request and subject to a minimum quantity.

Specified by Experts Worldwide

Polyfelt's worldwide manufacturing, distribution and application engineering services are available to assist you with your geotextile project. Please contact our regional office nearest you.

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Telefax: 16783 clag dk
Polyfelt Far East
Singapore 0923
Telephone: 73-728-83
Telefax: 556412 clagle rs

polyfelt



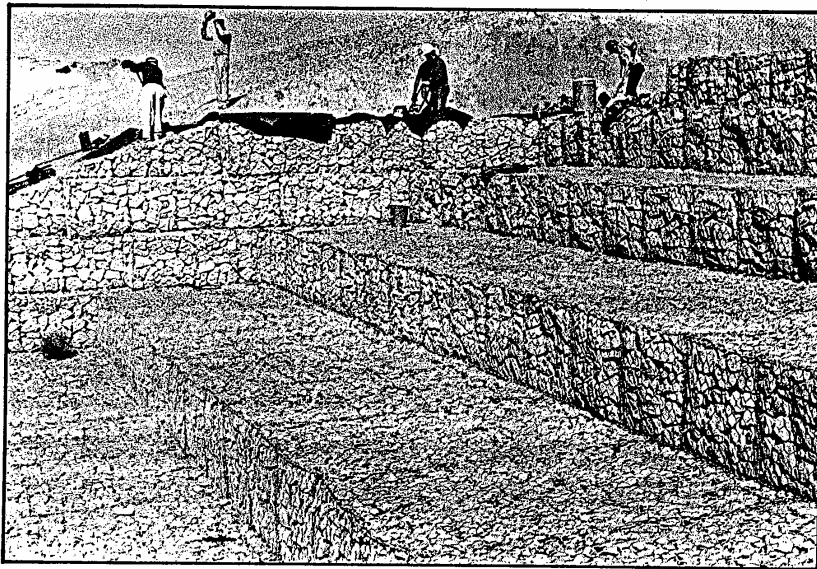
6439 East 30th St.
P.O. Box 19784
Indianapolis, IN 46219-0784
(317) 546-6340
Fax (317) 546-6344



MACCAFERRI GABIONS

*We are
number one!*

Instructions for Assembly and Erection



This publication presents the procedure for proper gabion installation. The method is quite simple; unskilled labor can be readily trained to perform the various tasks. If the proper procedures are followed, an economical, attractive,

and structurally sound gabion installation will be assured. Technical literature describing the use of gabions for various applications is available on request. Maccaferri's technical staff is available to lend any assistance that may be required.

Supply and Delivery:

Gabions are supplied folded flat, tied in pairs and packed in bundles. For ease in handling, the number of gabions per bundle varies according to the size of the gabion. The gabions are identified by color stripes and by labels

indicating their code size and dimensions. The lacing wire is supplied in coils.

If contract specification requires additional wiring extra coils may be ordered at reasonable cost.

Assembly:

Remove a single gabion from the bundle and proceed to unfold it on a hard flat surface. Stretch the gabion and stamp out all kinks (See Fig. No. 1). Fold the front and back panels to a right angle by stepping on the base along the crease. Fold up the end panels and diaphragms and fasten them to the front and back panels using the heavy gage wire projecting from the upper corners of each panel. This procedure will assure properly squared baskets with the tops of all panels even. Securely lace all vertical edges of ends and diaphragms. Use only Maccaferri connecting wire supplied for this purpose. No substitution of common wire is allowed, as this may not meet the specification requirements.

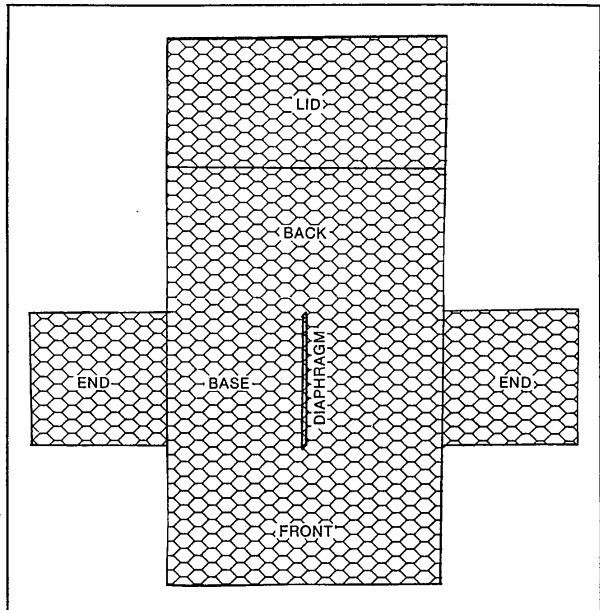


Fig. No. 1

The lacing procedure is as follows: cut a length of lacing wire approximately $1\frac{1}{2}$ times the distance to be laced but not exceeding 5 feet. Secure the wire terminal at the corner by looping and twisting, then proceed lacing with single and double loops at approximately five (5) inch intervals (See Fig. No. 2). Securely fasten the other lacing wire terminal.

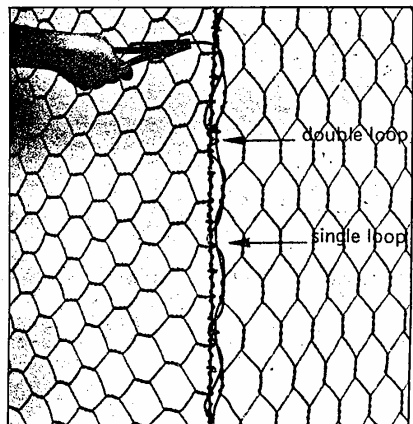


Fig. No. 2

Installation:

Before placing the gabions, it is necessary to make the ground surface relatively smooth and even.

The assembled gabions are carried to the job site and placed in their proper location. It is convenient to place the gabions front to front and back to back, as illustrated in Fig. No. 3, in order to expedite the stone filling and lid lacing operations.

For structural integrity, adjacent gabions must

be laced along the perimeter of ALL contact surfaces.

To facilitate this operation it may be easier to construct sub-assemblies in the yard consisting of as many gabions as can be handled by the crew at one time. The sub-assembly is then placed at the job site and laced along the perimeter of ALL contact surfaces.

The base of the empty gabions placed on top of a completed row must also be tightly wired to the latter. (See blown up section).

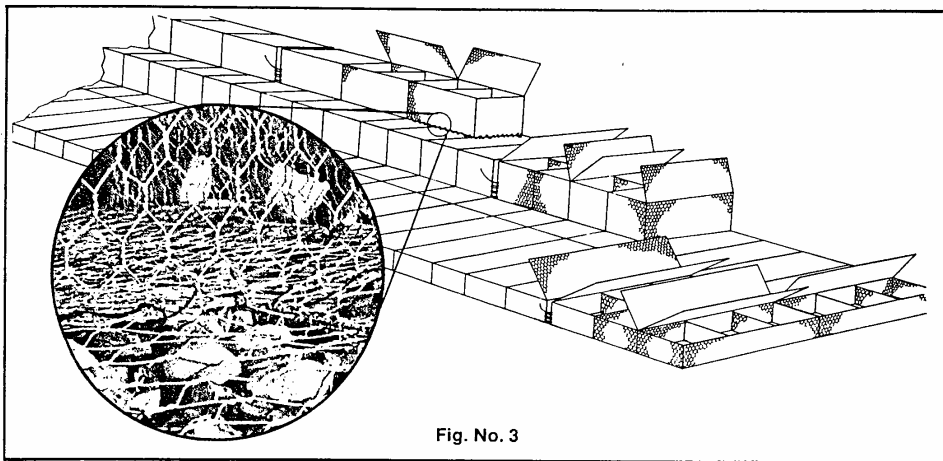


Fig. No. 3

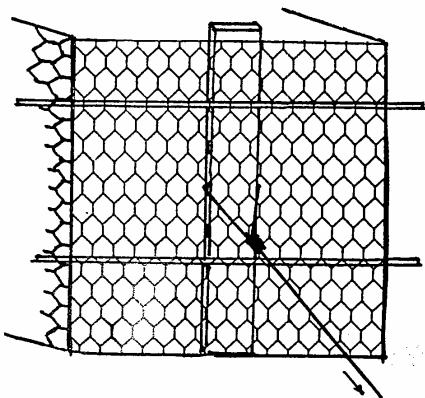


Fig. No. 4

The following method applies to three foot high gabions. Gabions should be placed empty and laced for a stretch approximately 100 linear feet. The first gabion shall be firmly anchored and tension shall be applied to the other end with a come-a-long or other means, in order to achieve the proper alignment. (See Fig. No. 4.) Anchoring can be accomplished by partially filling the first gabion with stone.

While gabions are being stretched, inspect all corners for open "V's" which will result if corners were not properly secured. Such "V's" must be closed by relacing.

Keep gabions in tension while being filled; leave the last gabion empty to allow for easily lacing the subsequent sub-assembly.

Filling:

The fill material shall consist of hard, durable stone, graded between 4 to 8 inches or as approved by the Engineer. All stone must be of size sufficient to be retained within the mesh.

Gabions shall be filled in lifts of one foot at a time. Two connecting wires shall be placed between each lift in each cell of all exposed faces and firmly wired as indicated in Figures 5 and 6. This operation is repeated until the gabions are completely filled.

It is important that the mesh forming the lid be stretched tight when the gabion is wired closed in order that there can be no movement of the fill.

For coastal structures additional requirements apply to choice of fill and to workmanship. Information on these requirements will gladly be supplied on application to any Maccaferri Area Office.

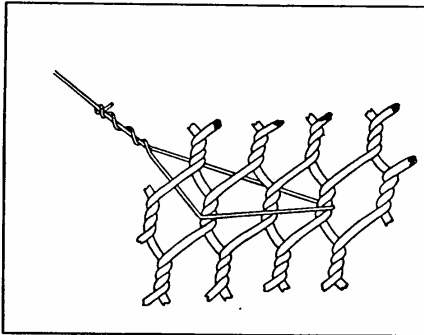


Fig. No. 5

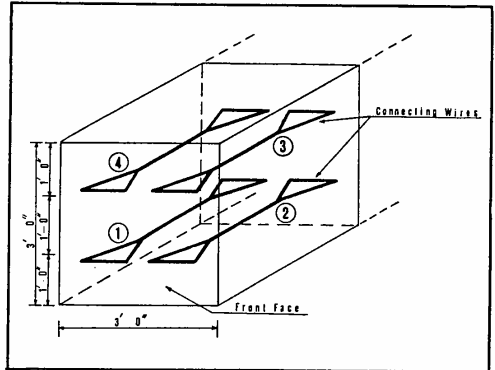


Fig. No. 6

Mechanical Filling

As most filling operations are carried out by machine it is helpful to protect the top edges of the diaphragms and end panels from being bent or folded by the stone during placement. There are several methods by which this can be achieved.

Rebars may be temporarily placed across the top edges of each mesh panel and laced to them to prevent movement.

Alternatively lengths of pliable metal may be bent into a V shape and placed over the vertical panels to deflect the stone.

During filling the stone should be dumped from the bucket when it is in the lowest practicable position.

gabions may be filled by almost any type of earth-handling equipment: payloader, gradall, crane, conveyor or modified concrete bucket. Some manual stone adjustment is required, during the filling operation is required to prevent undue voids. (See Figs. No. 7 & 8).

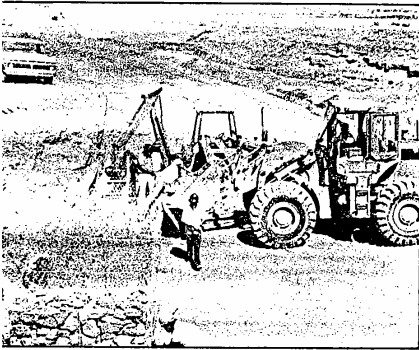


Fig. No. 8

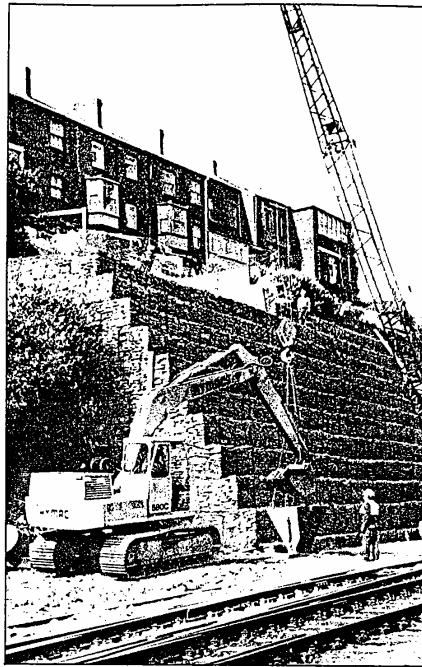


Fig. No. 7

The exposed face(s) should be hand-placed using selected stone. This hand-placing will add to the appearance of the structure by preventing the gabions from bulging. (See Figs. No. 9 & 10).

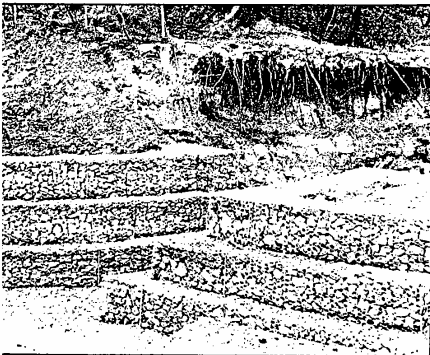


Fig. No. 9

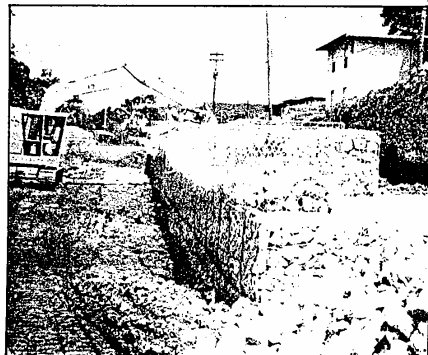


Fig. No. 10

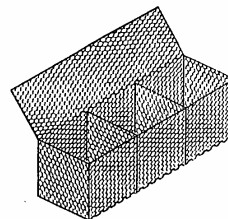
The last lift of stone should be level with the top of the gabion to properly close the lid and provide an even surface for the next course. The mesh must be stretched tight at all times.

TABLE OF SIZES

Letter Code	Length	Width	Height	Number of Diaphragms	Capacity Cubic Yards	Color Code
A	6'	3'	3'	1	2.0	BLUE
B	9'	3'	3'	2	3.0	WHITE
C	12'	3'	3'	3	4.0	BLACK
D	6'	3'	1'6"	1	1.0	RED
E	9'	3'	1'6"	2	1.5	GREEN
F	12'	3'	1'6"	3	2.0	YELLOW
G	6'	3'	1'	1	0.66	BLUE-RED
H	9'	3'	1'	2	1.0	BLUE-YELLOW
I	12'	3'	1'	3	1.33	BLUE-GREEN

Gabions

Also available in P.V.C. coated wire



SPECIFICATIONS

SPECIFICATIONS

ZINC COATED

PVC COATED

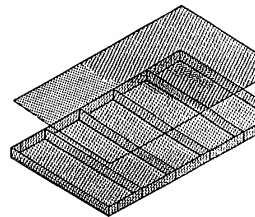
Mesh opening	Hex. nom. $3\frac{1}{4}" \times 4\frac{1}{2}"$	Hex. nom. $3\frac{1}{4}" \times 4\frac{1}{2}"$
Wire for netting	0.1181" nom. diam.	0.1062" nom. diam. plus nom. 0.02165" PVC
Wire for selvages	0.1535" nom. diam.	0.1338" nom. diam. plus nom. 0.02165" PVC
Wire for binding	0.0866" nom. diam.	0.0866" nom. diam. plus nom. 0.02165" PVC
Zinc coating	0.80 ozs. per sq. ft.	0.80 ozs. per sq. ft. plus nom. 0.02165" PVC

Minimum thickness of PVC coating shall be not less than 0.015".

Letter Code	Length	Width	No. of Thickness	No. of Cells	Area Square Yards	Capacity Cubic Yards	Color Code
Q	9'	6'	6"	3	6	1	WHITE-YELLOW
R	12'	6'	6"	4	8	1.33	WHITE-GREEN
T	9'	6'	9"	3	6	1.5	RED-YELLOW
U	12'	6'	9"	4	8	2	RED-GREEN

Reno mattress

Also available in P.V.C. coated wire



SPECIFICATIONS

ZINC COATED

PVC COATED

Mesh opening	Hex. nom. $2\frac{1}{2}" \times 3\frac{1}{4}"$	Hex. nom. $2\frac{1}{2}" \times 3\frac{1}{4}"$
Wire for netting	0.0866" nom. diam.	0.0866" nom. diam. plus nom. 0.02165" PVC
Wire for selvages	0.1062" nom. diam.	0.1062" nom. diam. plus nom. 0.02165" PVC
Wire for binding	0.0866" nom. diam.	0.0866" nom. diam. plus nom. 0.02165" PVC
Zinc coating	0.70 ozs. per sq. ft.	0.70 ozs. per sq. ft. plus nom. 0.02165" PVC

Minimum thickness of PVC coating shall be not less than 0.015".

Lid Closing:

Fold the lid down along the hinge line so that the lid and gabion edges meet closely without gaps. To assist in closing and lacing the lids, a pinch bar or Maccaferri lid closer may be used. (See Figs. 11 & 12). Secure the lid at the corners with the wire projecting from the lid. Lace the

lid shut, starting with the front face and then the ends and diaphragms. A tight joint must be achieved during the lacing operation by pulling the edges together. To expedite the lacing operation, adjacent lids may be wired to the vertical panels in one operation.



Fig. No. 11

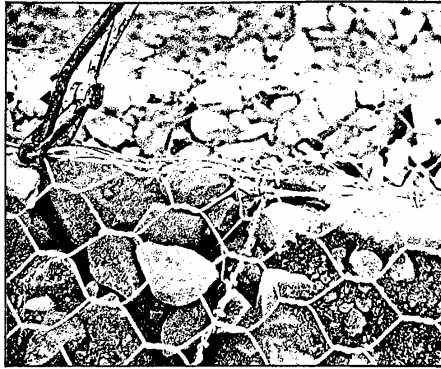


Fig No. 12

General Notes:

Gabions may be readily cut or bent to form regular shapes to fit bridge piers, culverts, transitions, etc. Part of the mesh may also be cut to allow the laying of pipelines. Where this is done the cut or bent edges of the mesh must not be left loose but shall be fastened securely to another part of the structure.

Hand tools are available to assist these operations. Please inquire at the Area Office listed below. Field assistance by members of our technical staff is also available on request.

The construction process is shown in a movie/ video film which is available on loan.

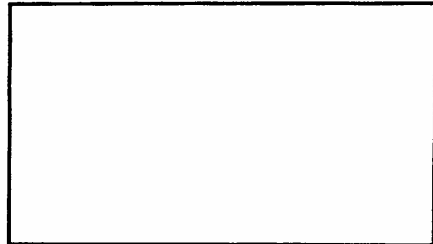
Corporate Offices & Plant:-



MACCAFERRI GABIONS, INC.

1000 ERMOR LANE BLVD.
LAURENSPORT, MD. 21795
PHONE: (301) 223-6910
FAX: 292338

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AE1/A (Rev. 10-85)

EROSION CONTROL BLANKETS



NATURE'S
EROSION
CONTROL
GREEN

Nature's Blanket



General Material Specifications

Erosion Control Blankets

S-75, S-150, SC-150, SCC-225, C-125 and P-300

- Increase moisture retention
- Stay in place until vegetation is established
- Reduce rainfall impact
- Reduce water velocity
- Reduce soil loss

North American Green Erosion Control Blankets provide water velocity reductions of **56-78%**, leading the industry. Lower velocities mean less soil scouring and less sediment transport.

S-75

For use on Moderate Slopes

MATERIAL CONTENT:

Straw 100% .75 lb/
sq. yd.

Netting
(light wt.) (1) side only
photo-
degradable

Thread Biodegrad-
able cotton

PHYSICAL SPECS:

Width 6.5 ft.
Length 83.5 ft.
Weight 45 lbs.
Area60 sq. yd.

S-150

For use on Moderate to Heavy Slopes

MATERIAL CONTENT:

Straw 100% .75 lb/
sq. yd.

Netting
(light wt.) (1) side only
photo-
degradable

Netting
(heavy wt.) (1) side only
photo-
degradable

Thread Biodegrad-
able cotton

PHYSICAL SPECS:

Width 6.5 ft.
Length 83.5 ft.
Weight 45 lbs.
Area60 sq. yd.

*Curtiss
Site*

North American Green Erosion Control Blankets are clearly superior to alternative mulching products in reducing the concentration of sediment in runoff water.

In University tests, North American Green Erosion Control Blankets reduced soil losses by up to 99% when compared to bare soil losses.

North American Green erosion control blankets are the most cost-effective products available today for channel linings and critical, erodible sites.

SC-150

For use on Severe Slopes with High Velocity Run-Offs

MATERIAL CONTENT:

Straw 70% .53 lb/
sq. yd.

Coconut
Fiber 30% .23 lb/
sq. yd.

Netting
(light wt.) (1) side only
photo-
degradable

Netting
(heavy wt.) (1) side only
photo-
degradable

Thread Biodegrad-
able cotton

PHYSICAL SPECS:

Width 6.5 ft.
Length 83.5 ft.
Weight 46 lbs.
Area60 sq. yd.

SCC-225

For use on Severe Slopes with High Velocity Run-Offs

MATERIAL CONTENT:

Straw 70% .53 lb/
sq. yd.

Coconut
Fiber 30% .23 lb/
sq. yd.

Netting
(light wt.) (1) side only
photo-
degradable

Netting
(heavy wt.) (1) side only
photo-
degradable

Thread Biodegrad-
able cotton

Paper Biodegrad-
able tissue

Seed KY-31 Fes-
cue 200 lb/
acre-.04 lb/
sq. yd.

PHYSICAL SPECS:

Width 6.5 ft.
Length 70 ft.
Weight 65 lbs.
Area50 sq. yd.

Channel Liners

C-125 and P-300

- Stay in place under peak flows
- Minimize channel erosion, even on steep slopes

North American Green C-125 and P-300 blankets can withstand flows up to 12 fps at slopes of 12%, and even higher flows at lower slopes.

P-300

For use as Permanent Ditch Liner

MATERIAL CONTENT:

Nylon
Fiber 100% .90 lb/
sq. yd.

Netting
(heavy wt.) Both sides
nondegrad-
able

Thread 100%
Polyester

PHYSICAL SPECS:

Width 6.5 ft.
Length 83.5 ft.
Weight 54 lbs.
Area60 sq. yd.

C-125

For use on Extreme Slopes and Ditch Linings

MATERIAL CONTENT:

Coconut
Fiber 100% .92 lb/
sq. yd.

Netting
(heavy wt.) Both sides
nondegrad-
able

Thread 100%
Polyester

PHYSICAL SPECS:

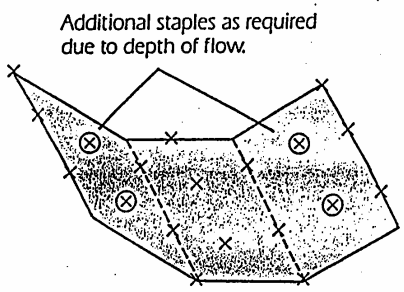
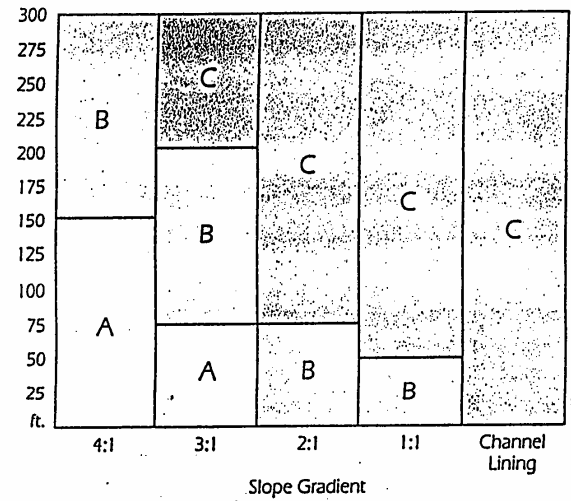
Width 6.5 ft.
Length 83.5 ft.
Weight 55 lbs.
Area60 sq. yd.

Staple Patterns Guide

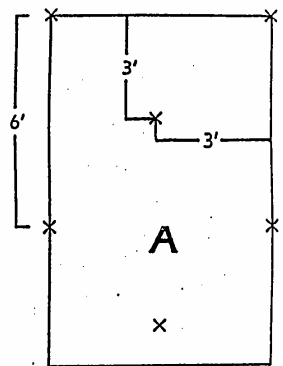
patterns apply to all North American Green control blankets. Staple patterns may vary upon soil type and average annual

lengths greater than 300 feet or where over large areas is directed onto the s, staple pattern "C" should be utilized.

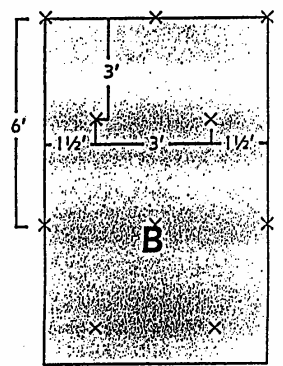
General Staple Recommendations



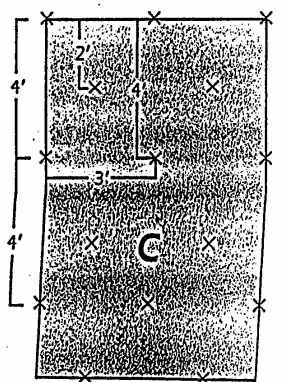
Channel linings utilize staple pattern "C" with additional staples on side slopes at projected water line.



1 staple per sq. yd.



1 1/2 staples per sq. yd.



2 staples per sq. yd.



Hoham, Smith & Co., Inc.

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Auburn, IN 46706

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Erosion
Control
Blankets
&
Consulting



United States
Department of
Agriculture

Soil
Conservation
Service

600 S. College Avenue
Rensselaer, IN 47978

September 7, 1988

Brenda Knox
Div. of Soil Conservation, IDNR
FLXI Building, Purdue University
W. Lafayette, IN 47907

Dear Ms. Knox:

The following are my concerns in regard to the two proposed structure sites we visited near Lake Maxinkuckee.

Curtis Ditch (Section 26, T32N, R1E) - This site should support your proposed three foot high dam with a corrugated metal pipe through it. You should scalp approximately one foot below the dam before placing fill. Fill for the dam should be obtained from the site where soil borings No. 3, 6, and 7 were taken. Be sure to remove the top soil from the borrow area before excavating for dam fill. Replace topsoil on both the dam and the borrow area when finished.

It is recommended that no more than 12" to 18" of material be removed from the surface to build islands. If all the silt loam or clay is removed, exposing the clean sands below, seepage could be high. These clean sands probably are layered and can therefore convey water underground to below the dam. It is suggested that material from the borrow area be used to help construct islands.

Southeast Ditch (Section 34, T31N, R1E) - The spillway for this area should be placed as far south as possible on the toe of the existing hill. Do not place any structural components, except fill, on muck. Keep the earth fill design depth for the dam as low as possible. Remove live vegetation before placement of muck fill. Make the dam at least 12 to 14 feet wide on top and over build by about one foot to allow for excessive settlement.

Continuous maintenance of the fill will probably be required, therefore access to the dam must be provided for a dragline or large backhoe.

If I can be of further assistance, feel free to contact me.

Sincerely,


Ronald G. Sheffler

Agricultural Engineer





INDIANA DEPARTMENT OF NATURAL RESOURCES

600 S. College Avenue
Rensselaer, IN 47978

JAMES M. RIDENOUR, DIRECTOR

August 23, 1988

Brenda Knox
Division of Soil Conservation
Indiana Department of Natural Resources
FLXI Building, Purdue University
West Lafayette, IN 47907

Dear Brenda:

The following is in regards to two on-site soils investigations made for the "T by 2000" lake enhancement project at Lake Maxinkuckee. The purpose of the investigation at site number 1 was to determine the suitability of existing soil materials for construction of two or three small islands and an earthen dam for temporary water retention. At site number two the concern was the suitability of the soil material for an earthen dam again for temporary retention of water. The location of site number 1 was in the NE 1/4 of the SW 1/4 of sec.26, T.32N., R.1E. Site number 2 was located in the NE 1/4 of the NE 1/4 of sec.34, T.32N., R.1E.

The Marshall County Soil Survey shows area number 1 mapped as Brady sandy loam and Gilford sandy loam. Area number 2 is mapped as Houghton muck, drained and Wawasee sandy loam, 6 to 12 percent slopes, eroded.

Attached are blue lines of each area showing the approximate location and corresponding number of each soil boring.

Following is a brief description of each soil boring:

AREA NUMBER 1

<u>Soil Boring Number</u>	<u>Depth</u>	<u>USDA Classification</u>	<u>UNIFIED Classification</u>
1	0 - 10 inches	silt loam	CL
	10 - 36 inches	stratified loam, clay loam, and sand.	CL, CL-ML, SC, SM-SC
	36 - 60 inches	coarse sand with about 5 to 10 percent gravel	SP, SP-SM
2	0 - 56 inches	stratified silt loam, sand, and sapric muck.	CL, CL-ML, SC, SM-SC, OL (muck)
	56 - 60 inches	sand	SP, SP-SM

"EQUAL OPPORTUNITY EMPLOYER"

<u>il Boring</u>	<u>Depth</u>	<u>USDA Classification</u>	<u>UNIFIED Classification</u>
3	0 -12 inches	silt loam	CL
	12 -40 inches	stratified loam, clay loam and sand	CL, CL-ML, SC, SM-SC
	40 -60 inches	sand	SP, SP-SM
4	0 -10 inches	silt loam	CL
	10 -40 inches	stratified loam, clay loam and sand	CL, CL-ML, SC, SM-SC
	40 -60 inches	sand	SP, SP-SM
5	0 -14 inches	sand	SP, SP-SM
	14 -30 inches	silt loam	CL
	30 -60 inches	loam and clay loam	CL, CL-ML
6	0 -50 inches	sand	SP, SP-SM
	50 -60 inches	loam and clay loam	CL, CL-ML
7	0 -11 inches	sand	SP, SP-SM
	11 -24 inches	silt loam	CL
	24 -60 inches	loam and clay loam	CL, CL-ML

AREA NUMBER 2

0 -15 inches	sand	SP, SP-SM
15 -55 inches	sapric muck	PT
55 -60 inches	sand	SP, SP-SM
0 -48 inches	loamy sand and sand	SP, SP-SM, SM
48 -60 inches	sandy loam and sandy clay loam	SM, SM-SC, SC
0 -10 feet	sapric muck	PT

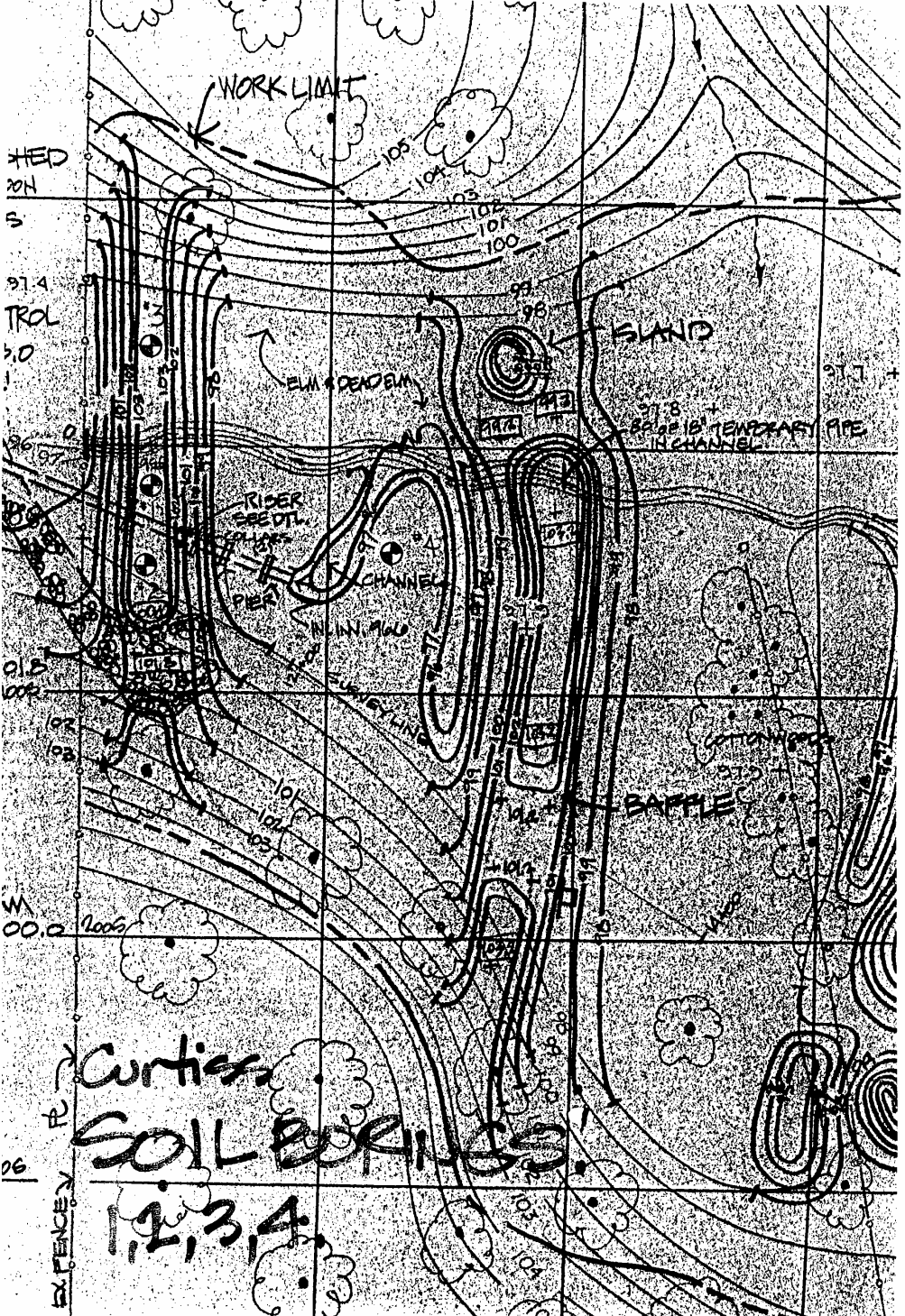
u have any questions or if I can be of further assistance, please let me know.

rely,

J Osterholz

Osterholz
gricultural Erosion Control Specialist

ure



27.4

TROL
5.0

27.8

27.5

27.2

26

EXPENSE

WORK LIMIT

SLAND

ELM + PEND BM

RIDER
SPEED

CHANNEL

PIER

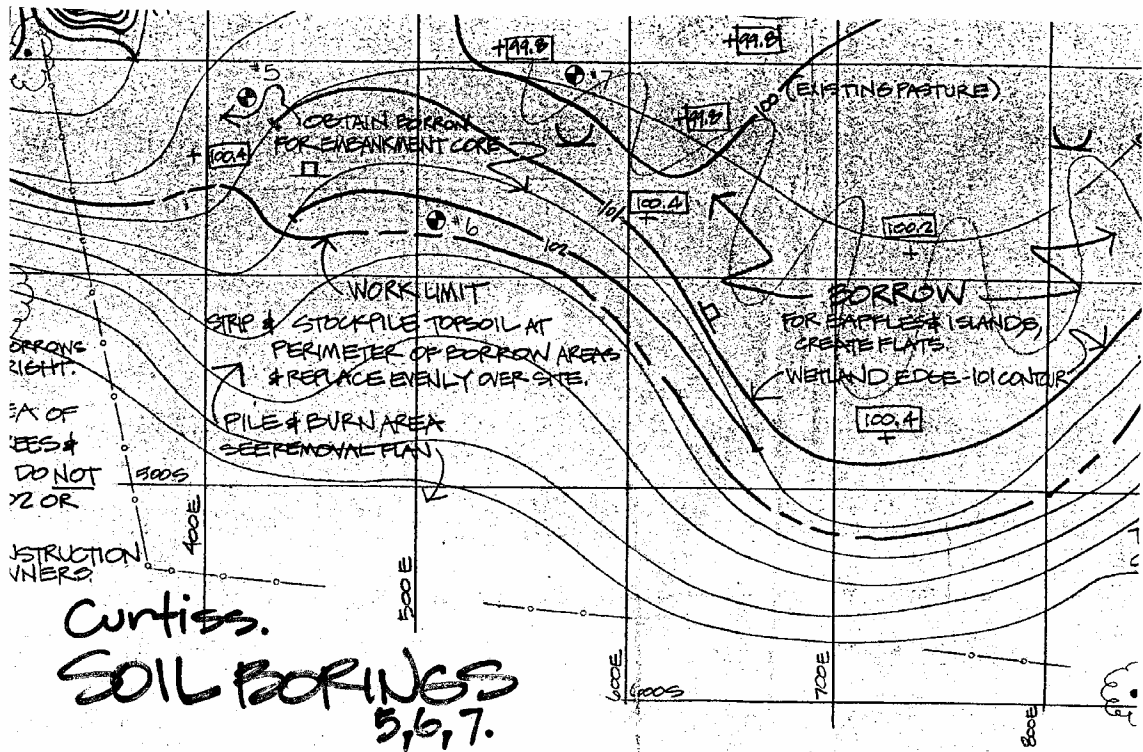
SUMMIT

BAFFLE

Curtis
SOIL BORINGS

1, 2, 3, 4

TEMPORARY PIPE
IN CHANNEL





DEPARTMENT OF THE ARMY
LOUISVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

August 29, 1988

GEORL-OR-FN
U88-721-07

Ms. Karen L. Dehne
Executive Director
Lake Maxinkuckee Environmental Council
106 North Main Street
Culver, Indiana 46511

Dear Ms. Dehne:

This is in regard to your August 18, 1988, letter concerning a proposal to create a wetland in the Ben Curtis Ditch, near Culver, in Marshall County, Indiana. We have reviewed the submitted data to determine whether a Department of the Army (DA) permit will be required under the provisions of Section 404 of the Clean Water Act.

The stream at the location of the proposed project does not have an average annual flow exceeding 5 cubic feet per second. Based on the information submitted, the proposed project would affect less than 1 acre of waters of the United States. Therefore, the discharge of dredged or fill material into the waterway was authorized under the provisions of 33 CFR, Section 330.5(a)(26)(i). An individual DA permit will not be required for this project, provided the work is performed in compliance with the enclosed Special Conditions.

This verification is only valid for 2 years from the date of this letter. If we can be of any further assistance, please contact us.

Sincerely,

Kenneth Mathews
Chief, Operations and
Readiness Division

Enclosures

LAKE MAXINKUCKEE ENVIRONMENTAL FUND, INC.

DIRECTORS:

Thomas H. Sams
John L. Babcock
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EXECUTIVE DIRECTOR

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106 North Main Street
Culver, Indiana 46511
(219) 842-3686

Mr. Marty Maupin
Indiana Department of
Environmental Management
105 South Meridian Street
Indianapolis, Indiana 46204

September 12, 1988

Dear Mr. Maupin:

RE: BEN CURTIS DITCH

Thank you for responding to our letter dated August 18, 1988 regarding the proposed Curtis Ditch project.

Based on our telephone conversation on September 8, 1988, it is my understanding the Indiana Department of Environmental Management will not require the Lake Maxinkuckee Environmental Council to obtain a #401 permit for the project as long as the Army Corps of Engineers does not require a #404 permit. As you instructed, I have enclosed, for your files, a copy of the letter from the Army Corps of Engineers stating an individual DA permit will not be required for the project.

Again, thank you for your prompt response.

Sincerely,

LAKE MAXINKUCKEE ENVIRONMENTAL COUNCIL

Karen L. Dehne
Executive Director

COPY: W.W. Pippenger, LMEC Chairman
Richard E. Ford, LMEF, Inc.
Gary Doxtater, IDNR
Bill Eviston, Earth Plan Consultants ✓